INDIA RUBBER WORLD

OUR 63rd YEAR

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NOVEMBER, 1951

Cabot's NEW Low-Cost Oil Furnace Black!

Sterling-V
(V for VERSATILE)

Modulus of HMF, Resilience of SRF, Smooth Extrusion Typical of Oil Blacks

GODFREY L. CABOT, INC.
77 FRANKLIN ST., BOSTON 10, MASS

You can improve processing of "LOW TEMPERATURE" GR-S with Du Pont RPA No. 3

Manufacturers now using Du Pont RPA No. 3 to peptize "low temperature" GR-S report that it:

- ✓ **Reduces nerve.**
- ✓ **Shortens breakdown time.**
- ✓ **Makes processing easier.**

IF YOU ARE HAVING TROUBLE breaking down "cold rubber" satisfactorily, it will pay you to investigate Du Pont RPA No. 3.

This highly effective peptizing agent reduces the characteristic nerve of "low temperature" GR-S, which ordinarily makes these stocks hard to handle. Breakdown time is materially shortened. Fillers and compounding agents are added more easily.

Du Pont RPA No. 3 has proved particularly effective in X-628 GR-S, the high-conversion, oil-extended polymer. Addition of 0.5 to 1.0 part helps to form a smooth band rapidly. Stocks won't swell at the tuber.

You'll find complete information on the use of RPA No. 3 in both GR-S and natural rubber in our Report No. 50-5. Ask your Du Pont representative for a copy of the report and a sample quantity of RPA No. 3 . . . or write: E. I. du Pont de Nemours & Co. (Inc.), Rubber Chemicals Div., Wilmington 98, Del.

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DU PONT RUBBER CHEMICALS

E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Del.

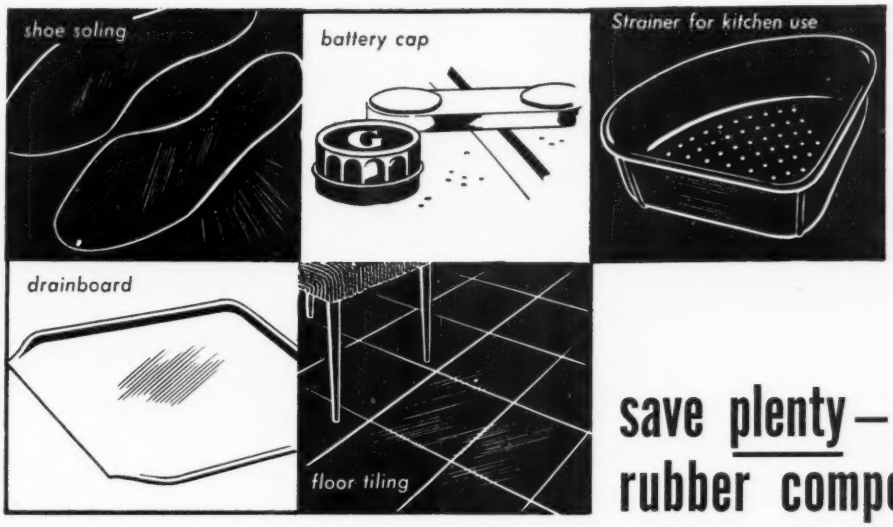
DU PONT

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

INDIA RUBBER WORLD, November, 1951. Vol. 125, No. 2. Published Monthly by BILL BROTHERS PUBLISHING CORP., Office of Publication, Orange, Conn., with Editorial and Executive Offices at 386 Fourth Avenue, New York 16, N. Y., U.S.A. Entered as Second Class Matter at the Post Office at Orange, Conn., under the act of March 3, 1879. Subscription United States and Mexico, $3.00 per year; Canada $4.00; All Other Countries $5.00; Single Copies 35 Cents. Address Mail to N.Y. Office.

News about

B. F. Goodrich Chemical Company *raw materials*



save plenty—get improved rubber compounding, too!

...with Good-rite RESIN 50

HERE'S an easy-processing, reinforcing agent that cuts rubber compounding costs—and helps you get improved finished products.

First big advantage of Good-rite Resin 50 is that it provides a new and simple compounding approach to hardness problems. As an example—it's a means of filling in the gap between soft rubber compounds and ebonites.

Good-rite Resin 50 brings *more* advantages. It saves time by eliminating masterbatching. Your rubber compounds gain better flex life, higher elongation, improved abrasion resistance. They are more easily handled because Resin 50 acts as a plasticizer at processing temperatures.

For extruded shapes such as gaskets, tubing, coving, etc., especially on hard compounds, Resin 50 provides improved surface smoothness and superior processing characteristics in the extruder.

A white, free-flowing powder, Good-rite Resin 50 can be compounded in a wide range of colors. Send for technical information. Find out how Good-rite Resin 50 can give you *better* results at *lower* costs. Just write Dept. CB-6, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco.

B. F. Goodrich Chemical Company
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GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers • HARMON organic colors

Conditions rugged? Roads too rough?

Use **Philblack*** **O.** *It makes tires tough!*

Abrasion resistance has not been determined for the hoofs of mountain goats but just compare Philblack O with other blacks in either synthetic or natural rubber compounds.

And there this high abrasion resistant furnace black, Philblack O, really shines. Tire treads, particularly cold rubber treads, made with Philblack O soak up punishment and ask for more.

All by itself, Philblack O rewrote the record book on long, dependable mileage at high speeds and heavy loads. For tough jobs well done, use Philblack O.

Our technical service representatives are available to assist you in compounding and processing problems. Or consult the Philblack Sales Service Laboratory in downtown Akron. Philblack O is shipped in bags or in bulk in hopper cars specially designed to facilitate unloading.

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Philblack A and Philblack O are manufactured at Borger, Texas. Warehouses in Akron, Boston, Chicago and Trenton.
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Thiazoles

THE ALL-PURPOSE ACCELERATORS

MBT. . . . . *Mercaptobenzothiazole*

MBTS. . . . *Benzothiazyldisulfide*

OXAF . . . *Zinc mercaptobenzothiazole*

RECOMMENDED ACCELERATOR COMBINATIONS PER 100 R. H. C.

* **Natural rubber tennis shoe soling**	0.4 MBT – 0.6 MBTS – 0.1 MONEX – 1.8 sulfur
* **Natural rubber latex foam sponge**	1.5 OXAF – 0.5 ETHAZATE – 2.5 sulfur
* **Natural rubber tire carcass**	0.75 MBTS – 3.0 sulfur
* **GR-S tire tread**	1.5 MBTS – 2.0 sulfur
* **GR-S general mechanical goods**	1.5 MBTS – 2.0 sulfur
* **GR-S C-V wire**	1.5 OXAF – 0.5 MONEX – 2.0 sulfur
* **GR-S chemical blown sponge**	1.0 MBTS – 0.5 MONEX – 2.0 sulfur
* **Paracril oil resistant gasket**	1.5 MBTS – 1.5 sulfur
* **Butyl inner tubes**	0.5 MBT – 1.25 TUEX – 2.0 sulfur

PROCESS • ACCELERATE • PROTECT with NAUGATUCK CHEMICALS

Naugatuck Chemical Division of **United States Rubber Company**

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Rubber Chemicals • Aromatics • Synthetic Rubber • Plastics • Agricultural Chemicals • Reclaimed Rubber • Latices

all in partnership with rubber...

but no two wires alike!

● Pictured above are four typical examples of the many special-purpose wires developed by National-Standard for wire-in-rubber products.

They do have one essential quality in common —a highly developed affinity for adhesion with rubber. But beyond that, each has a different job to do . . . and is painstakingly engineered to do it . . . effectively!

For years National-Standard has specialized in improving the behavior of wire in rubber—digging into all the intricacies of application, fabrication, finish, corrosion, strength, elongation, adhesion and innumerable details you might never bother with.

Main reason for all this research, this "groundwork", is to help you improve your products, increase production, conserve materials and cut costs! Perhaps you now face *new* defense production problems involving wire. Remember, National-Standard service is always at *your* service.

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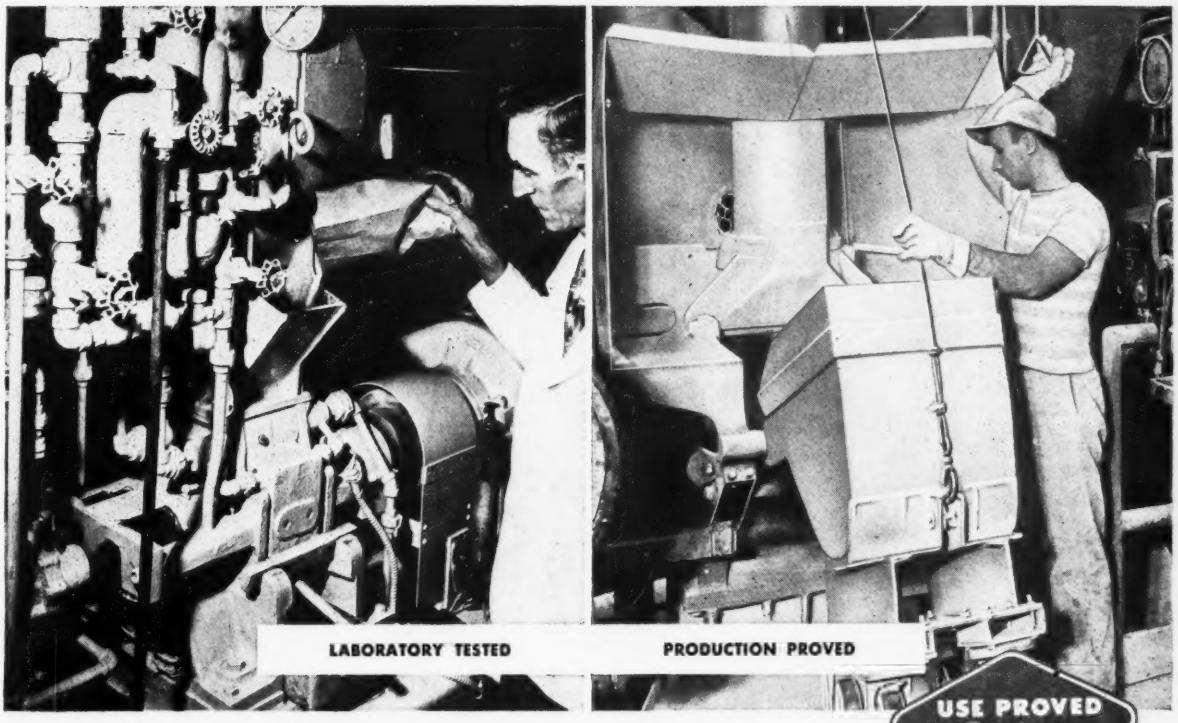
DIVISIONS OF NATIONAL-STANDARD CO.

ATHENIA STEEL	*Clifton, N. J.* — Flat, High Carbon, Cold Rolled Spring Steel
NATIONAL-STANDARD	*Niles, Mich.* — Tire Wire, Fabricated Braids and Tape
REYNOLDS WIRE	*Dixon, Illinois* — Industrial Wire Cloth
WAGNER LITHO MACHINERY	*Jersey City, N. J.* — Lithographing and Special Machinery
WORCESTER WIRE WORKS	*Worcester, Mass.* — Round and Shaped Steel Wire, Small Sizes



Get Better Dispersions in the Banbury with

PLIOLITE S-6B

PROVED in the laboratory—proved in production — you get better dispersions with PLIOLITE S-6B. Where other resins give you marginal dispersions, PLIOLITE S-6B gives you excellent dispersions —and where other resins give you poor dispersions, PLIOLITE S-6B gives you marginal dispersions. You can be sure of securing the physical characteristics you want in your compounds—using natural or synthetic rubbers —when you reinforce with PLIOLITE S-6B.

PLIOLITE S-6B is used in a wide range of finished products, including shoe soles, rubber flooring, extruded wire insulation and molded rubber items of various types. And right now—while PLIOLITE S-6B is in temporary short supply—you can evaluate it in your own laboratory in preparation for your own use.

Send today for full details and sample for evaluation to:

Goodyear, Chemical Division, Akron 16, Ohio

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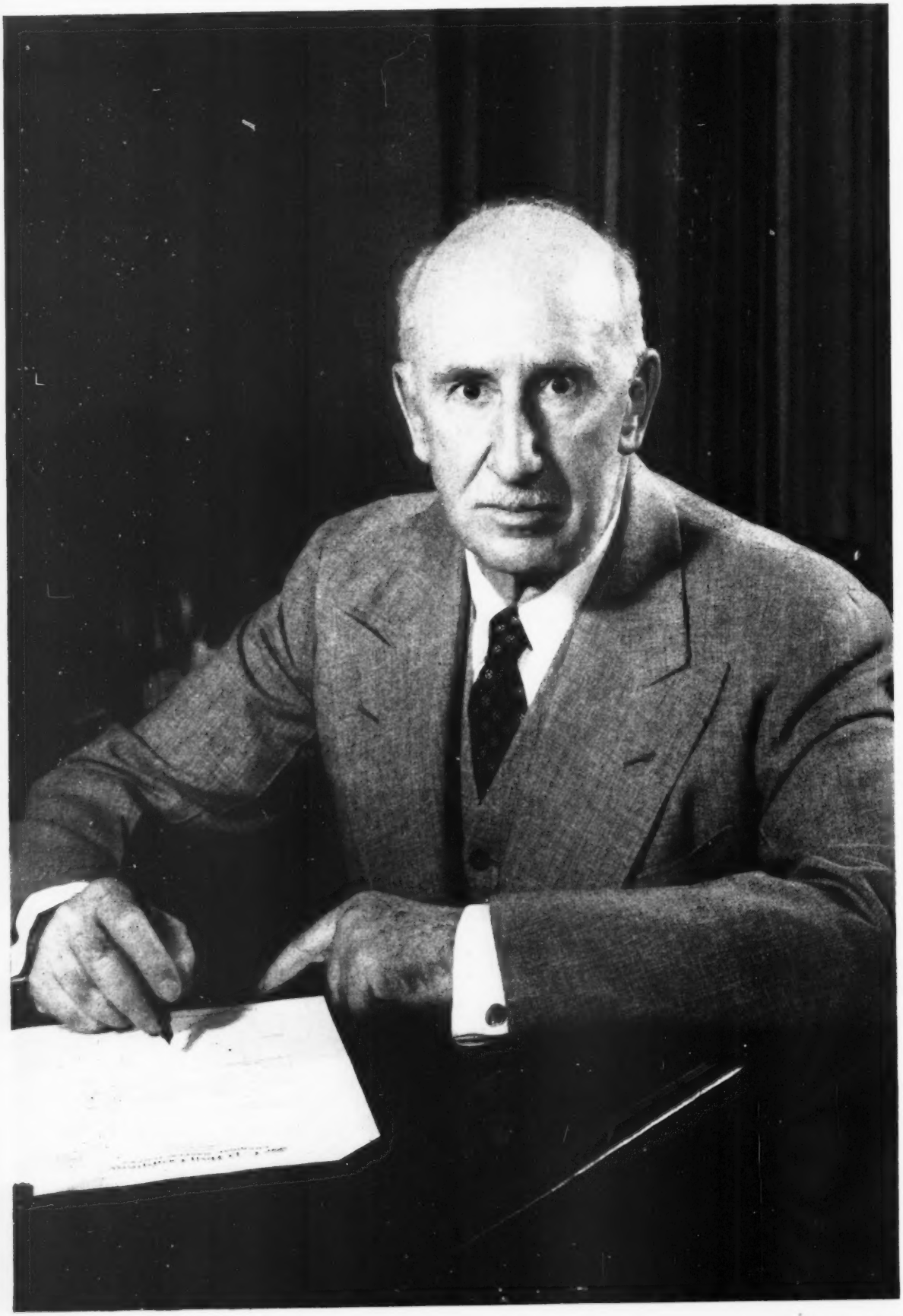
Pliolite—T.M. The Goodyear Tire & Rubber Company, Akron, Ohio



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November 22, 1951

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To our Customers:

The Thanksgiving Season reminds us of the part you have played in making our past year a happy and successful one. Your continued trust and loyal friendship mean much to us. We are duly thankful.

We sincerely appreciate the business which you have given us and trust that we have maintained the high standards of service to which we aspire and that all your dealings with us have been to your entire satisfaction. Please be assured that we shall continue to endeavor to merit your confidence and good will.

Thanking you again for your interest and support and extending our sincere wishes for your enduring success and prosperity, we remain

Very sincerely yours,

THE C. P. HALL COMPANY

C. P. Hall

President

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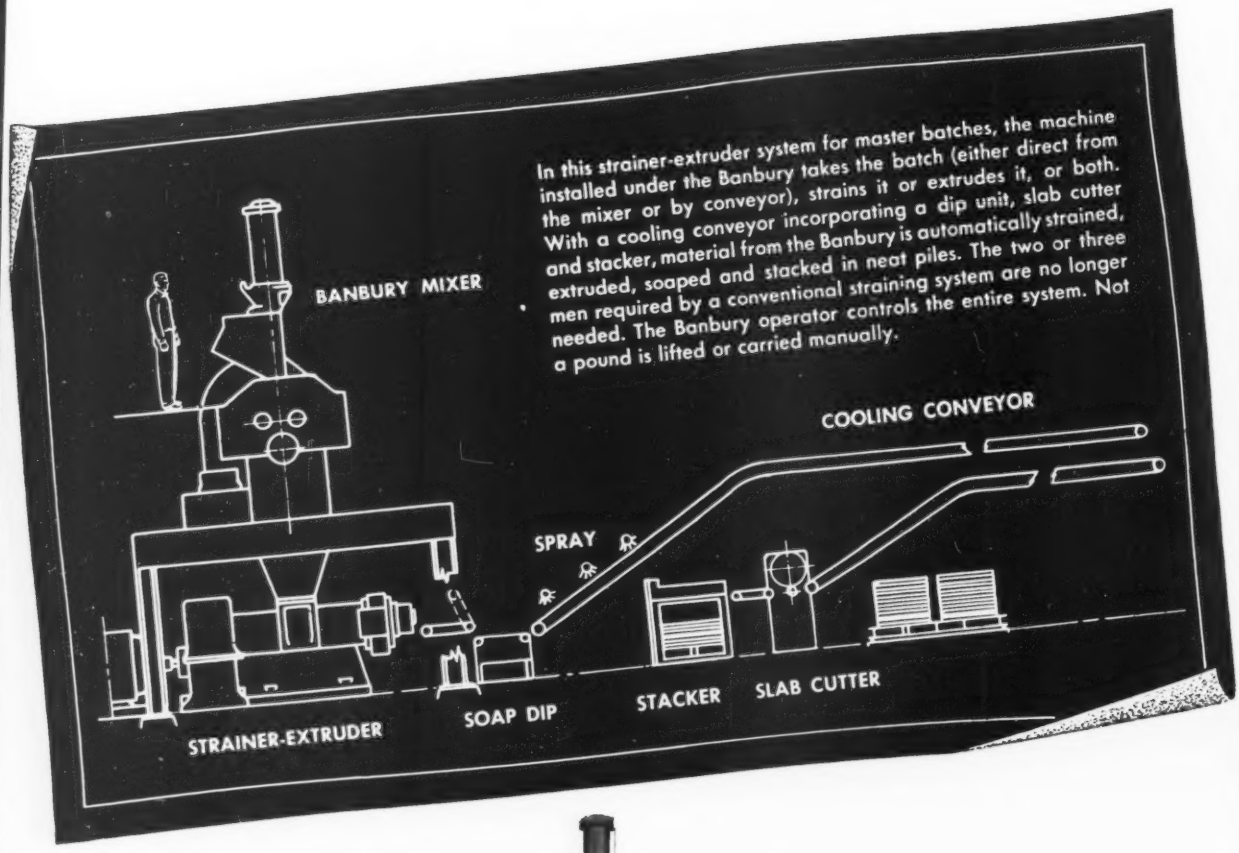
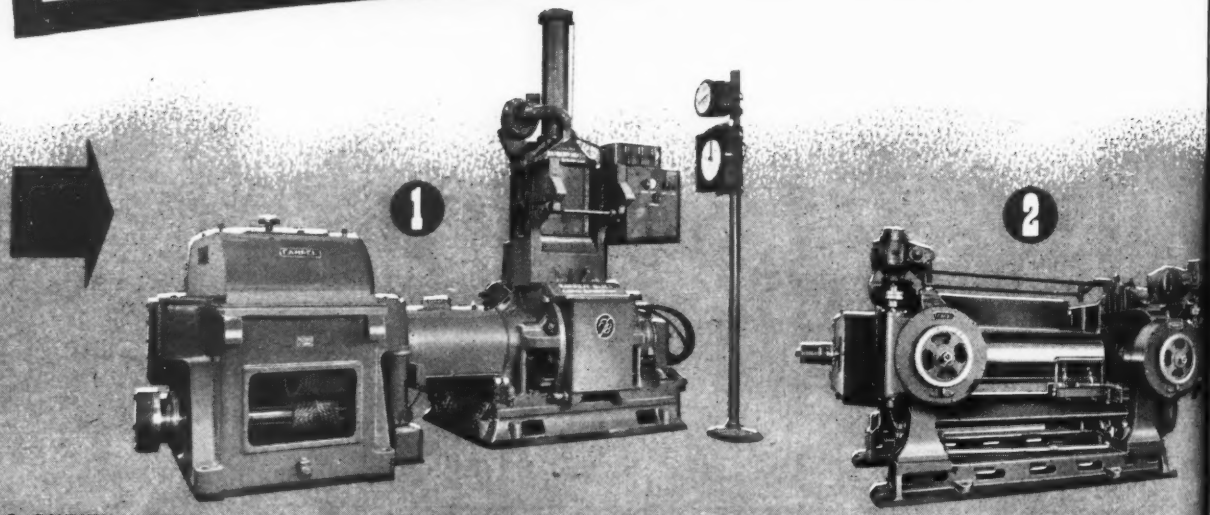
COMPLETE PROCESSING LAYOUTS

. . . engineered by Fa


In this strainer-extruder system for master batches, the machine installed under the Banbury takes the batch (either direct from the mixer or by conveyor), strains it or extrudes it, or both. With a cooling conveyor incorporating a dip unit, slab cutter and stacker, material from the Banbury is automatically strained, extruded, soaped and stacked in neat piles. The two or three men required by a conventional straining system are no longer needed. The Banbury operator controls the entire system. Not a pound is lifted or carried manually.
BANBURY MIXER
COOLING CONVEYOR
SPRAY
STRAINER-EXTRUDER
SOAP DIP
STACKER
SLAB CUTTER



1. BANBURY MIXERS are widely used in the processing of rubber and plastics. They produce uniformly mixed stocks of superior quality, with reduction in production cost and elimination of dust and fume hazards. They are made in seven sizes, from the laboratory size B to the No. 27 with batch capacity of 1000 pounds (1.50 specific gravity stock). *Bulletin No. 189.

2. MILLS — Farrel-Birmingham mills for mixing, grinding, warming and sheeting are built in a complete range of sizes, from 6" x 13" for the laboratory up to 28" x 84" heavy-duty machines for the factory. For special requirements, variations in designs are obtainable often from existing plans. *Bulletin No. 173.

...TS

...by Farrel-Birmingham®

For many years Farrel-Birmingham has made a specialty of engineering complete setups for processing rubber and plastics. The F-B engineering department is staffed by men with special training and unusual qualifications who have had many years of experience in the design of machinery built by the company.

The layout shown here is typical of successful installations developed by Farrel-Birmingham engineers. These installations are composed of production units designed for most efficient step-by-step conversion of raw material to the finished or semi-finished product, then matched in capacity for planned processing flow. Production flows smoothly, without costly interruptions, and manual aid and supervision are reduced to a minimum.

Farrel-Birmingham engineers will be glad to discuss the possibility of improving your production efficiency or cutting your handling costs through planned processing flow. Write for further information about any of the production units described in these pages.

FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONNECTICUT
Plants: Ansonia and Derby, Conn., Buffalo, N.Y.
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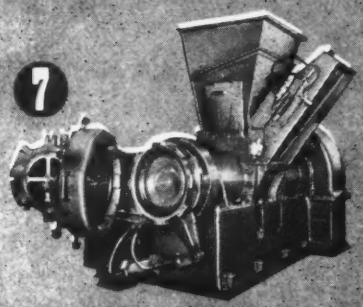
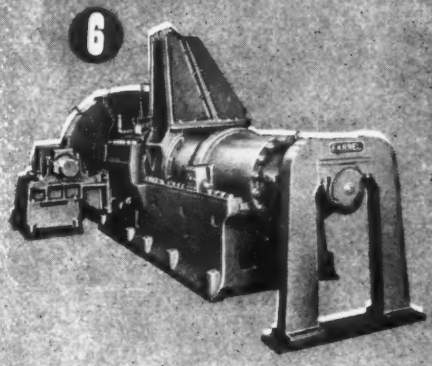
Farrel-Birmingham®

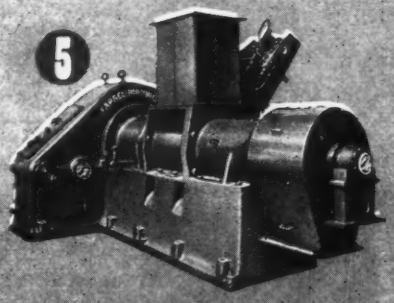
**Ask for bulletins by subject and number.*



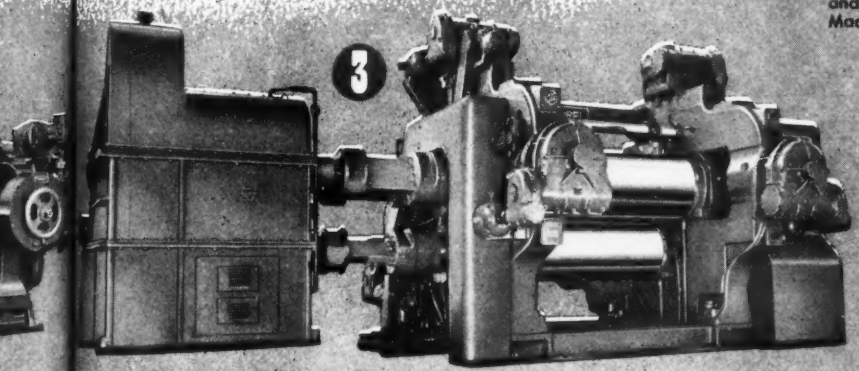
7. STRAINER-EXTRUDERS are designed to receive stock directly from a Banbury and discharge directly into a calender or other processing unit, eliminating the need for sheeting or warming mills. Made in 7", 8½" and 12" sizes to match the capacities of standard 3A, 9 and 11 Banburys. *Bulletin No. 33-R-502.



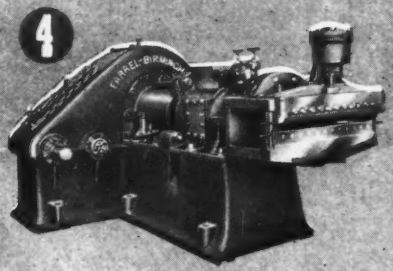
6. GORDON PLASTICATORS are designed for breaking down rubber. They soften the stock by mechanical action so that it may be more readily worked and mixed with compounding ingredients in subsequent operations. Made in 12", 15" and 20" sizes.



5. HALE PELLETIZERS — Designed to transform hard-to-handle rubber into small, free-flowing pellets, the Hale pelletizer also improves the plasticity of the stock and gives better dispersion of the various ingredients. Machines are built in 7", 12", 15" and 20" sizes.



3. CALENDERS — Farrel-Birmingham calenders are made in any size for both laboratory and factory. Designed to fit individual requirements, they are made with any number and arrangement of rolls and fitted with attachments to suit their particular function. *Bulletin No. 174.



4. TUBING AND STRAINING MACHINES — Built for high-speed, low-temperature operation, these machines extrude stock of high density and uniformity. Exclusive roller feed maintains a constant supply of stock to the screw and eliminates trapped air. Available in 6", 8", 8½" and 10" sizes. *Bulletin No. 175.

but Skellysolve delivered!

"Doc" MacGee says: Ask any Skellysolve customer how he fared during the Great Flood of 1951. He'll tell you that in spite of one of the greatest disasters in recent history, Skellysolve "delivered the goods." No production line stoppages because of solvent shortages!

Fact is, not one single customer suffered a shortage of Skellysolve—even though rail facilities in Kansas City, Topeka, Manhattan and many other places were almost completely under water.

How the Skelly organization kept Skellysolve shipments going to their destinations during those exciting days would make a story that could fill a book. But to Skelly customers, the only story that matters is that their Skellysolve was shipped as ordered—and arrived on time to keep production going!

What's behind that almost superhuman performance? An organization with over 20 years of pioneering and specialized experience in solvents. Strategically located bulk plants. And flexible, optional methods of delivery. For instance, in several emergencies when rail lines were out, Skellysolve was delivered by tank truck—or shipped in drums by truck transport. If one didn't work—the other did.

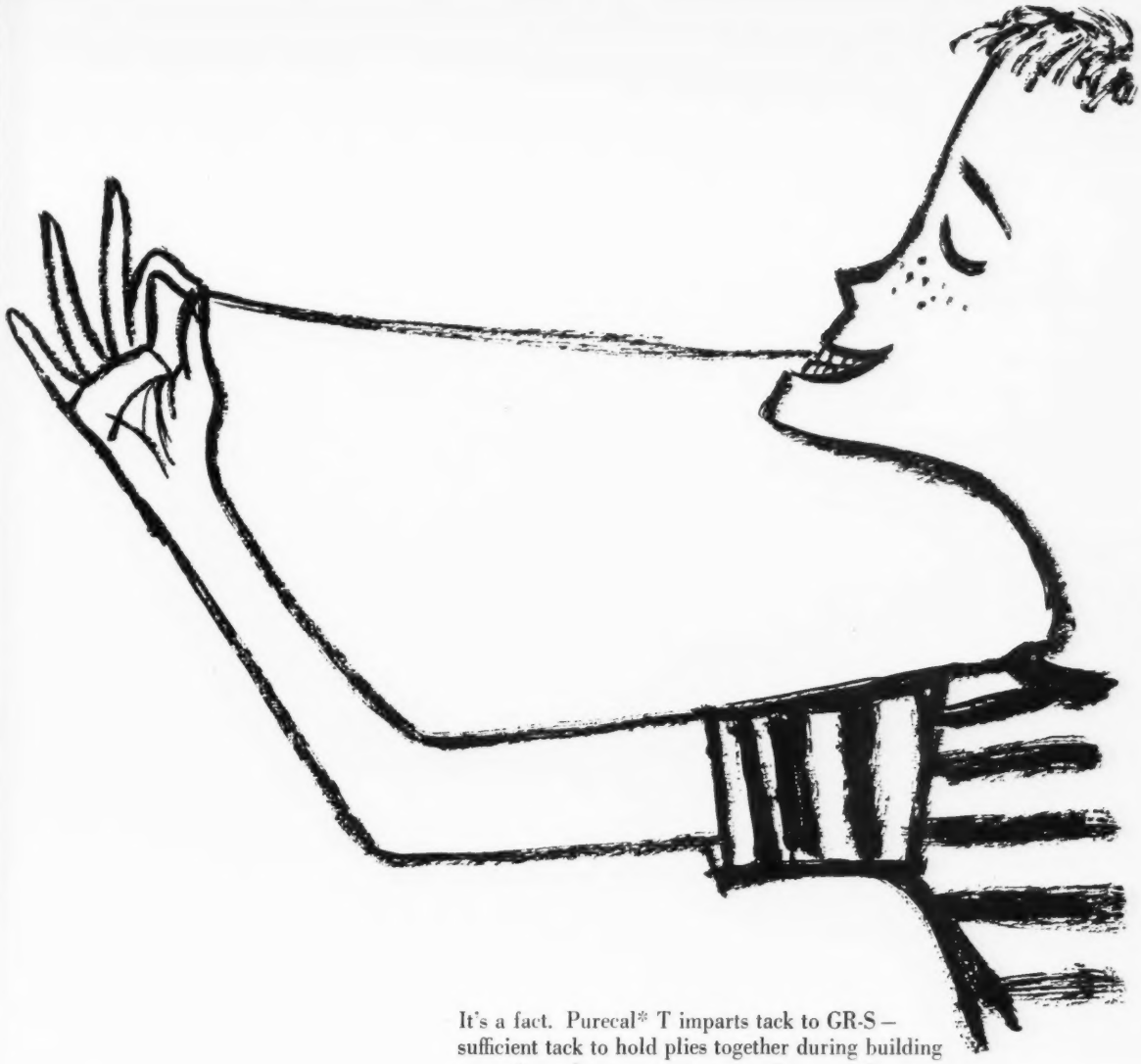
MORAL: If you depend on your solvent supply to keep you going regardless of weather or disasters, it will pay you to use Skellysolve!

From strategically located supply centers . . . by tank car, tank truck, drums . . . *depend on* SKELLYSOLVE SUPPLY

SKELLY

Skellysolve

SOLVENTS DIVISION, SKELLY OIL COMPANY
KANSAS CITY, MISSOURI



You can get tack with Purecal in GR-S

It's a fact. Purecal* T imparts tack to GR-S — sufficient tack to hold plies together during building operations. In most cases, cementing operations can be eliminated and much of the automatic building equipment used with natural rubber can be used with GR-S.

Purecal T is easier to process in GR-S than in natural rubber. It mixes easier and faster. Because of its ultra-fine qualities, it produces tack and promotes high quality in non-black stocks. Using Purecal T, you can get excellent results at low cost in passenger tire carcasses, hose and belting products, footwear and gum stripping.

We know this — not just from laboratory tests — but mainly from work in plants. We've recorded the findings in a new booklet: "Purecal in GR-S." It contains practical information on the compounding and processing of Purecals in GR-S and cold rubber. We think you'll find it useful — we'll be glad to send it to you.

*Trademark

SODA ASH • CAUSTIC SODA • BICARBONATE OF SODA
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HYDROGEN • DRY ICE • SYNTHETIC DETERGENTS • GLYCOLS
CARBOSE (Sodium CMC) • ETHYLENE DICHLORIDE • PROPYLENE DICHLORIDE • AROMATIC SULFONIC ACID DERIVATIVES
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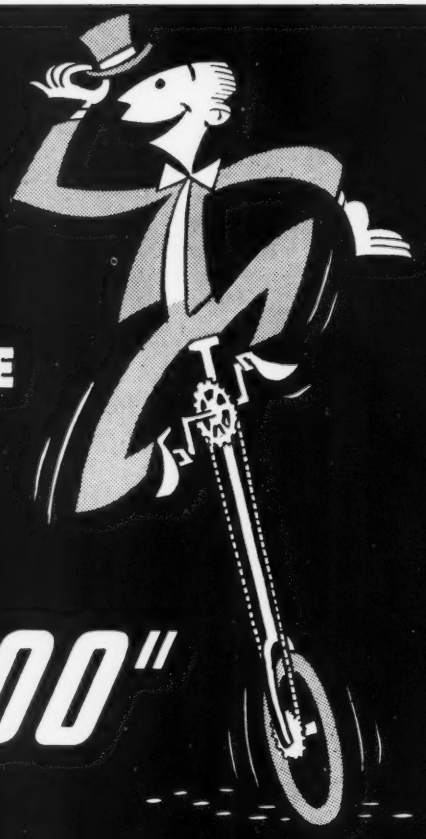

Marbon "8000"

Look what Marbon "8000" can do for your rubber compounds

- *Higher hardness without brittleness*
- *Improved flex crack growth resistance*
- *Better abrasion resistance*
- *Improved weather and heat resistance*
- *Unlimited color possibilities (non-staining)*

Marbon

MARBON CORP.

GARY, INDIANA

SUBSIDIARY OF BORG-WARNER

It BLENDS as it STRENGTHENS as it IMPROVES

PX
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No

You're on the *Right Course* with Dependable PX Plasticizers!

The jobs for plastics are growing—and growing *tougher*—every day! The military, for example, is using dozens of new products made of versatile vinyl plastics—products which must take a regular diet of heat, cold, abrasion or constant flexing.

To a large degree it's the *plasticizer* that makes these articles so durable and useful. That's why manufacturers demand plasticizers of uniform maximum quality . . . an advantage they're assured of when they specify Pittsburgh PX Plasticizers.

As a basic and integrated producer of coal chemicals—benzene, xylene, pyridine and phthalic anhydride, to name just a few—we're able to control and maintain the high quality of our plasticizers from coal to finished product. And that means better performance and ease of use in your formulations.

Whether you're considering plasticizers—or the basic products of our other integrated divisions—remember that the Pittsburgh name and trademark stand first and foremost for *reliability.*

PX-104 — DiButyl Phthalate
PX-108 — DilsoOctyl Phthalate
PX-138 — DiOctyl Phthalate
PX-208 — DilsoOctyl Adipate
PX-404 — DiButyl Sebacate
PX-408 — DilsoOctyl Sebacate
PX-658 — TetraHydroFurfuryl Oleate
PX-917 — TriCresyl Phosphate

W&D 3888

PITTSBURGH COKE & CHEMICAL CO.

COAL CHEMICALS • AGRICULTURAL CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

MOLDS COME CLEAN *Everytime* WITH COLITE!

Just as a housewife butters a muffin tin, you can use Colite on any kind of a rubber mold. And you'll find using this highly-concentrated liquid mold-release, as a spray or sponge, pays off with substantial savings!

You can count on jobs coming out with uniform precision — with no pinching, dragging, trimming or spoilage to contend with — and with a transparent, smooth, satiny finish that insures added sales-appeal.

Non-toxic, non-tacky, odorless Colite, developed especially for the rubber industry, comes in a highly-concentrated form, which you dilute with water to the most effective strength for the stock and job at hand — making it economical to use! Send for a sample to test in your plant, now!

Use as a spray or sponge on

Tire molds
General molds
Recapping molds
Inner-tube molds

★

Use as a lubricant for

Tires or Mandrels

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For light colored stock

SPECIFY COLITE D43D

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PURITY · UNIFORMITY · DEPENDABILITY
Chemical Industries, Inc.
BOSTON 30, MASSACHUSETTS

Natural Rubber News

Published by the NATURAL RUBBER BUREAU

RUBBER GROWERS BATTLE REDS

MALAYAN WAR AGAINST COMMUNISTS IN 4TH YEAR

The Communists are losing a four-year-old battle for Malaya, chief source of the world's natural rubber.

Months of terrorism, murder and propaganda have failed to stem the flow of rubber to America, where today the world's largest stockpile of this strategic material is being built up for defense against Red aggression.

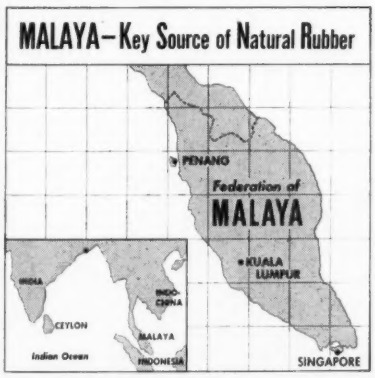
It has been a strange, nerve-wracking kind of warfare in Malaya. Red-trained bandits hide in the jungle, waiting for a chance to murder rubber planters, burn buildings, and destroy rubber trees. Frequent pitched battles occur — and there is the constant danger of a blast of machine gun fire from the edge of the jungle. .

To date, one out of 30 rubber "estate" managers have been murdered, as well as hundreds of workers, by this unseen Red jungle army.

But the battle is being won. Today over 100,000 British and Malayan police and soldiers are tracking down this Red army, one by one, while guarding the rubber trees and the homes of the workers.

Malaya has proved itself a stronghold of democracy in Asia. Its people — predominantly Malays, Chinese and Indians — have resisted both Red bullets and Red bulletins. And in the face of these obstacles, they have produced the natural rubber needed by the free world — more rubber than ever before.

The people of Malaya look to America as their best customer and powerful champion in the fight for freedom in Asia.



The new Federation of Malaya consists of 9 States and 2 Settlements (Penang and Malacca). Kuala Lumpur, capital of Federation, is located in the heart of rubber country. Malaya's 3,500,000 acres of rubber trees, in 1950, produced 700,000 tons of natural rubber.

MALAY GUARD at entrance to rubber plantation is part of a force of 100,000 men fighting against the Communists in Malaya.

Research Aids 350,000 Malayan Rubber Farmers

The Rubber Research Institute of Malaya is a self-help operation, financed entirely by the rubber farmers themselves to develop better methods of growing and processing natural rubber.

At the Institute, soil types are tested, better yielding strains are developed through cross-breeding and bud-grafting, new insecticides and weedicides are studied, and experiments with new processes are carried out.

But the work of the Institute goes far beyond the realm of test tubes and pilot plants. All over Malaya, R. R. I. "extension" workers are busy helping the 350,000 small rubber farmers to improve their holdings.

Improves Quality Yield

The Institute makes available high-quality stock for budgrafting, so the farmer may improve the yield and quality of his future crop. Institute field men instruct farmers in better growing, tapping, and processing methods. They teach budgrafting and the art of tapping to schoolboys, who will someday be rubber farmers. R. R. I. men have aided, too, in setting up the rubber cooperatives which are today helping smallholders realize increased profits by selling to a central processing factory.

Malaya's Smallholders

The 350,000 independent Malayan smallholders have an average of 4 acres of rubber trees each. At present prices, these trees give them an average gross income, before all expenses of operation, of not over $900 (U. S. dollars) on which to support the average smallholder's family of five.

Manufacturers Double Rubber Use In Ten Years

Tribute to the creative skill and production prowess of the American rubber manufacturers is the fact that rubber use in the U. S. has nearly doubled every 10 years since 1900.

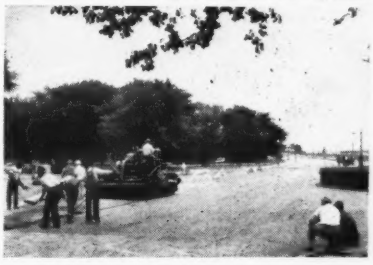
At the present rate, it is predicted that the United States will consume 1.8 million tons of new rubber in 1960 for tires, footwear, cushioning, industrial goods and hundreds of other products that add to the American standard of living.

Today the world rides, sits, sleeps and walks on rubber.

D. C. Gets Its First Natural Rubber Road

The nation's capital recently put down its first section of road paving incorporating natural rubber powder at Rock Creek Parkway and Constitution Avenue, in a heavily-traveled part of Washington.

The new natural rubber section is one of several experimental stretches which have been put down in the United States and Canada during the past two years.



Tests indicate that asphalt-rubber paving is more durable, stands up better under extreme temperature changes, reduces skidding hazards, and has a tendency to resist the formation of an ice film.

For those interested, a free booklet — "Stretching Highway Dollars with Rubber Roads" — will be sent on request by the Natural Rubber Bureau, 1631 K Street, N.W., Washington 6, D.C.

FREE BOOKLET

The history of the natural rubber industry, production and consumption statistics, and a pictorial account of how rubber is produced in Southeast Asia are contained in "NATURAL RUBBER and YOU" — available free of charge from the

Natural Rubber Bureau

1631 K STREET, N. W., WASHINGTON 6, D. C.

There are 13 properties of SOLKA-FLOC®

which will improve your processing:

1. Uniformity
2. Strength
3. Variety
4. Color Stability
5. Purity
6. Low Gravity
7. Fibrousness
8. Controlled Bulk
9. Ashlessness
10. Chemical Inertness
11. Non Abrasiveness
12. Absorbency
13. Softness

And one or all are sure to better your product . . . increase your profits. Find out what Solka-Floc can do for you. Send your processing problems to our Technical Service Department for samples and recommendations.

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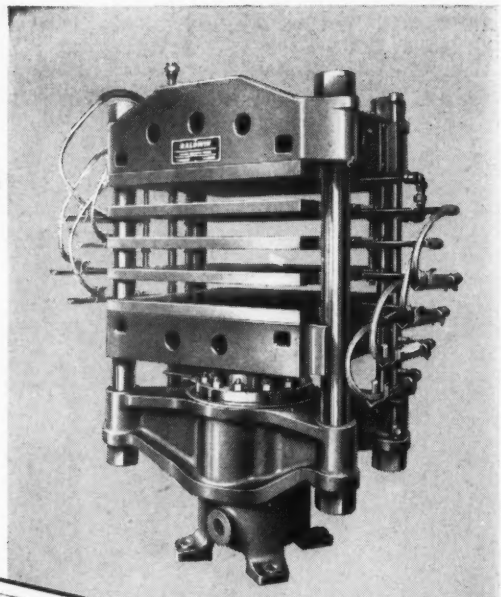
"Production-ize"

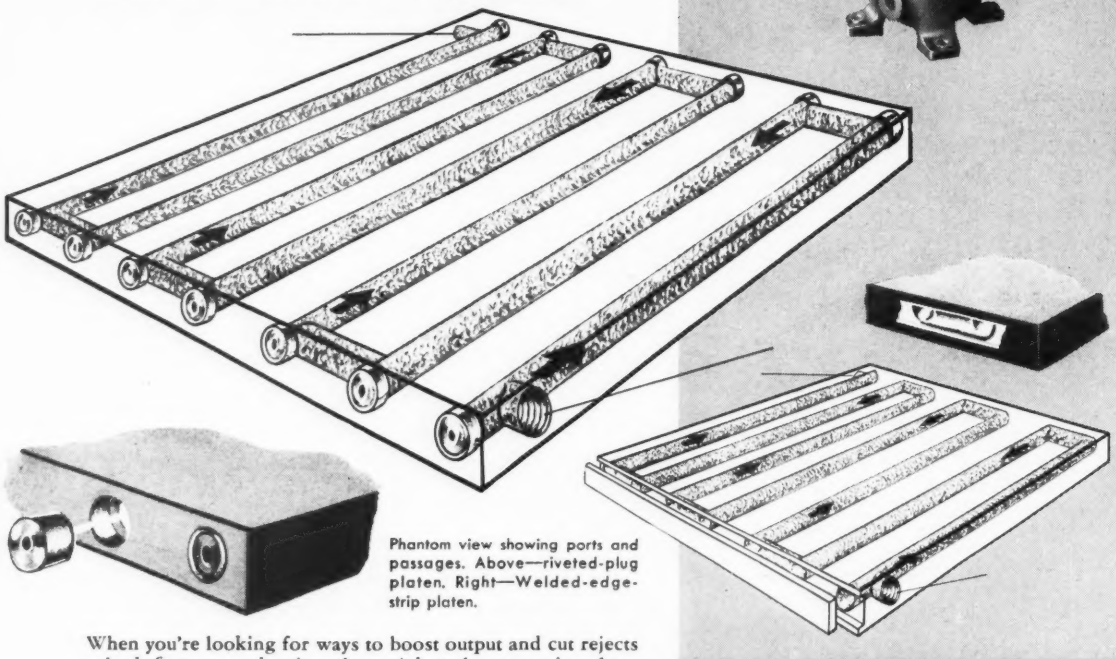
your steam platen presses with

BALDWIN

HEATING PLATES

scientifically ported for uniform surface temperature



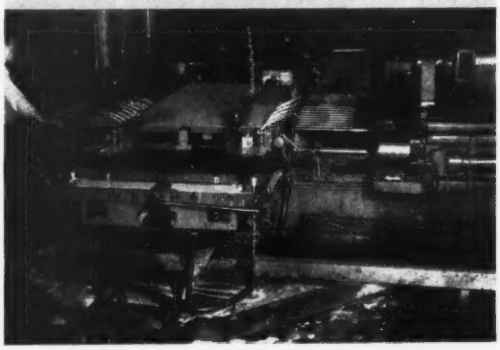


Phantom view showing ports and passages. Above—riveted-plug platen. Right—Welded-edge-strip platen.

When you're looking for ways to boost output and cut rejects —look *first* at your heating plates. A hot-plate press is only as good as its platens. Unless you get uniform surface temperatures, you'll never get top production.

Baldwin heating plates are designed to provide this all-important uniformity . . . special manufacturing methods and equipment have been developed to produce passages of rifle-barrel accuracy, properly locate cross-ports, provide steam-seal plugs and attain smooth, parallel working surfaces. The results are showing up in users' shops—and are one reason why Baldwin Platen Presses are on the production lines of so many successful concerns.

When you are repairing or modernizing old presses—"production-ize" the equipment by installing Baldwin Steam Plates. Available in a wide range of sizes. Just specify your needs giving machine model and number.



Multiple-spindle automatic double-end drilling machine, designed and built in the Baldwin shop for drilling steam plates to close tolerances.

Eddystone Division
Baldwin-Lima-Hamilton Corp.
Philadelphia 42, Pa.

BALDWIN - LIMA - HAMILTON

GENERAL OFFICES: PHILADELPHIA 42, PA. OFFICES IN PRINCIPAL CITIES

DOUBLE-CHECKED CHEMICALS FOR THE RUBBER INDUSTRY

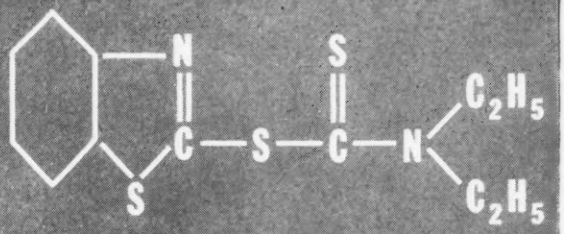
Self-Activating Primary Accelerator

SHARPLES ACCELERATOR

ETHYLAC

2-BENZOTHIAZYL-N-N-DIETHYL THIOCARBAMYL SULFIDE

V. 6. 10-73/1-SC-1248



Combines the essential chemical structures of both thiazole and thiuram types of accelerator.

Exhibits high activity; good delayed action; good processing properties.

Is non-discoloring; practically dust-free.

Requires no special handling precautions.

Has excellent storage stability.

Samples and compounding data available on request.

For further information, write to Dept. P.

PROPERTIES:

Color . . . . . light yellow

Odor . . . . . characteristic

Melting Point . . 69° C. min.

Volatiles . . . . 0.5% max.

Specific Gravity 1.27

Mol. Wt. (calcd) . . 282.4

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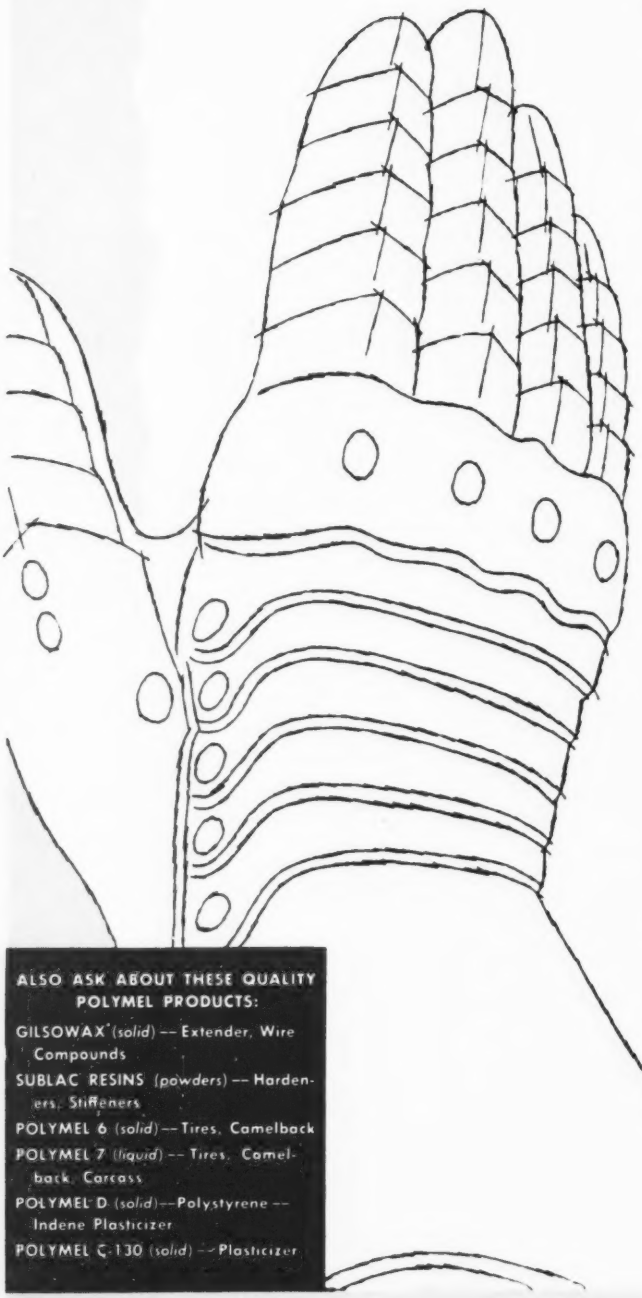
INTERMEDIATES FOR RUBBER CHEMICALS
ACCELERATORS • VULCANIZING AGENTS • PLASTICIZERS
WAX • POLYMERIZATION CONTROLLER

a challenge

to compounders of natural or synthetic rubber!



Try a free production sample of d-TAC, the new, non-coloring, powdered resin that reduces tackiness and milling time. Prove to yourself that d-TAC actually eliminates the problem of sticking to mill rolls!

Here are three reasons why leading rubber producers are turning to sensational new d-TAC to reduce costly tackiness in natural and synthetic rubbers!

1. VERSATILE—performs equally well in highly loaded natural or synthetic rubber batches. d-TAC has no effect on the cure or physical properties.

2. EFFICIENT—even in small quantities. You use only 1 to 6 parts of d-TAC on the rubber, depending upon the degree of tack to be reduced.

3. ECONOMICAL—d-TAC costs but 22c per pound, f.o.b. plant in l.c.l. quantities.

WRITE TODAY for your free sample of d-TAC and see for yourself how quickly you can put an end to milling problems, thus increasing the capacity of your mills.

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Use United Blacks

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KOSMOS 20

at hand...

the qualities you need!

It is easier to stay in the lead when you standardize on United Blacks. For example, KOSMOS 20 . . . an SRF black with extensive applications in the rubber industry. It is a black of dependable uniformity, outstanding for ease of processing, good plasticity and fast rate of cure. For maximum efficiency use KOSMOS 20.

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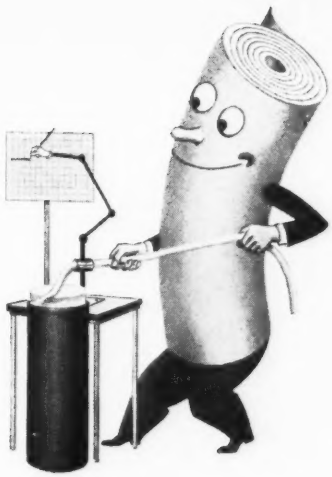
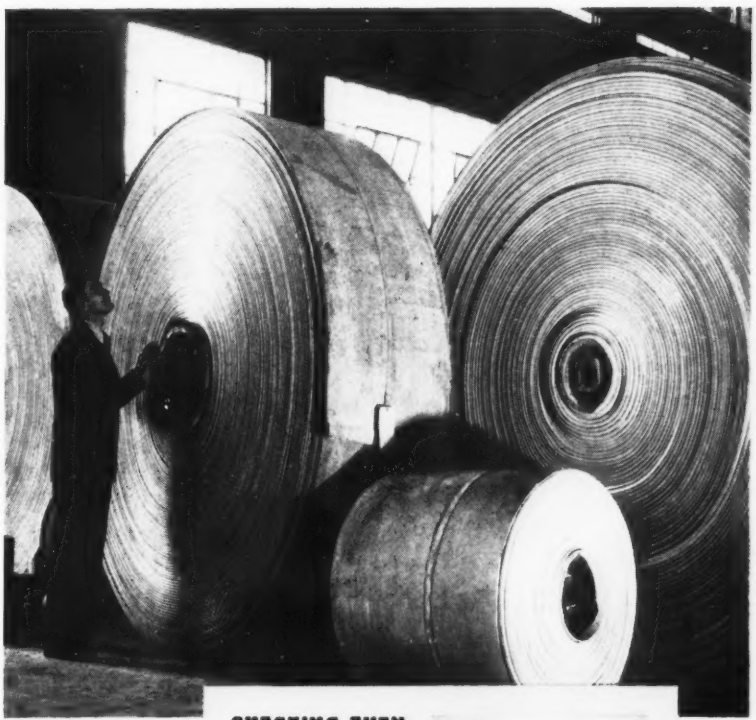


MT. VERNON — FABRICS

Give You Greater Fabric Uniformity



The greater uniformity of Mt. Vernon fabrics means *consistent* quality in your finished products—smoother, more efficient fabrication.

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Mt. Vernon-Woodberry's staff of textile engineers is available on request to help you with your problems in development or application of industrial fabrics.

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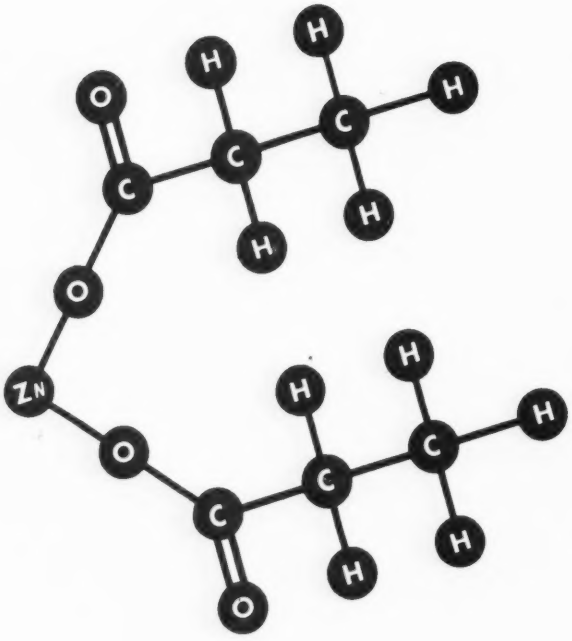
ACTIVATOR NEWS

HORSE HEAD PRODUCTS

A supplement to THE ACTIVATOR—the house organ issued by The New Jersey Zinc Company for over 15 years to aid the Rubber Industry in its use of Zinc Oxide.

FAVORED FORMULA FOR FASTER PROCESSING of ZINC OXIDE



Introduced to the Rubber Industry just a few years ago, this chemical (zinc propionate) is already the most favored processing and dispersion aid for zinc oxide.

It is available to the Rubber Industry in the form of a coating on zinc oxide, favorably modifying its physical properties without interfering with its activating characteristics.

Zinc propionate is formed as a coating on zinc oxide when the latter is treated with propionic acid at an elevated temperature. This coating forms around the individual particles, modifying their characteristics in these 3 ways:

1. **Prevents formation of aggregates—aids dispersion and reinforcement.**
2. **Provides faster wetting by rubber—cuts mixing time.**
3. **Adds plasticizing effect—speeds processing.**

These advantages, available only in Protox* zinc oxide, are proved by many manufacturers, as Protox is today the most widely used brand of zinc oxide. As one Banbury operator puts it, Protox-166 "streaks in" or "smears into the rubber" while untreated zinc oxide "spots in."

*U.S. Patents 2,303,329 and 2,303,330

THE NEW JERSEY ZINC COMPANY

Producers of Horse Head Zinc Pigments

... most used by rubber manufacturers since 1852

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HORSE HEAD PRODUCTS

Marvinol®

VINYL RESINS

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NAUGATUCK, CONNECTICUT

You can double the life of your vinyl compounds . . .

with DYPHOS

"Dutch Boy" Stabilizers

PRODUCT	USE
TRIBASE (Tribasic Lead Sulphate)	Electrical and other compounds requiring high heat-stability
TRIBASE E (Basic Lead Silicate Sulphate Complex)	Low volume cost insulation
DS-207 (Dibasic Lead Stearate)	Stabilizer-lubricant for sheeting, film, extrusion and molded compounds
PLUMB-O-SIL A (Co-precipitate of Lead Orthosilicate and Silica Gel)	Translucent and colored sheeting and upholstery stocks
PLUMB-O-SIL B (Co-precipitate of Lead Orthosilicate and Silica Gel)	Translucent and colored film, sheeting, belting
PLUMB-O-SIL C (Co-precipitate of Lead Orthosilicate and Silica Gel)	Highly translucent film and sheeting
DYTHAL (Di-basic Lead Phthalate)	General purpose stabilizer for heat and light. Good electrical properties
DYPHOS (Di-basic Lead Phosphite)	Outstanding for heat and light in all opaque stocks, including plastisols and organosols
NORMASAL (Normal Lead Salicylate)	As stabilizer or co-stabilizer in vinyl flooring and other compounds requiring good light-stability

Dutch Boy* CHEMICALS

*Reg. U. S. Pat. Off.

Greatly increased service life for your opaque vinyl products—unequalled light- and heat-stability—excellent color retention—lasting flexibility . . . these are advantages of stabilizing with "Dutch Boy" DYPHOS.

"Dutch Boy" DYPHOS is effective in upgrading quality because it has all four properties of the ideal stabilizer:

(1) Acid acceptor; (2) Reactive molecule; (3) Anti-oxidant; (4) Ultra-violet light screening agent.

This is shown by accelerated tests in the laboratory and by actual exposure tests.

Most vinyl formulations with DYPHOS show a *useful life at least twice* that of similar compounds using other stabilizers.

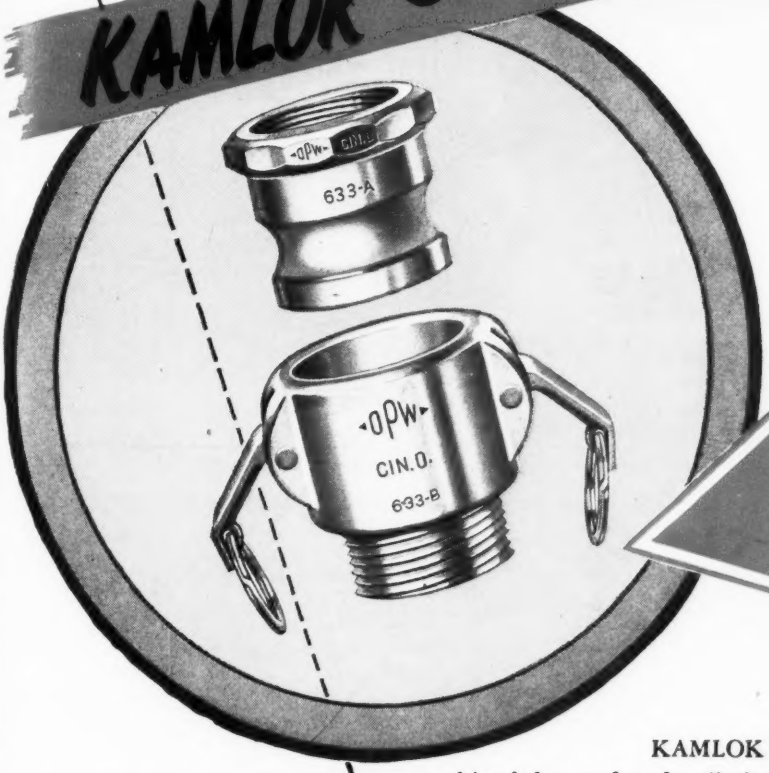
DYPHOS is recommended for high-quality vinyl compounds, including plastisols; also for systems using chloroparaffins as secondary plasticizers.

For complete factual data on DYPHOS and other "Dutch Boy" chemicals . . . for technical assistance in evaluating their use in your operations . . . write us.

NATIONAL LEAD COMPANY
111 Broadway, New York 6, N. Y.

The Fastest, Surest Coupling Known

KAMLOK COUPLING ASSEMBLIES



SLIPS ON
CAM TIGHTENS
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NEVER FAILS

KAMLOK Coupling Assemblies are precision machined for perfect fit, eliminating all possibility of leakage. No lugs, tools or wrenches required — KAMLOKS couple and uncouple instantly, regardless of "hook-up". No threads to engage, no twisting friction against gaskets.

KAMLOK Couplers assure long-lasting, economical service—reduce loading time — cut delivery costs — eliminate replacement costs due to damage—withstand pressures much greater than ordinary gravity or pump pressure—provide instant release in case of fire or other emergencies.

KAMLOK Coupling Combinations, also dust caps and dust plugs are available for all hose line coupling requirements, in sizes from ¾" to 4" inclusive.

Sizes ¾" to 3" are manufactured of special bronze alloy for long wear.

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for handling hazardous liquids
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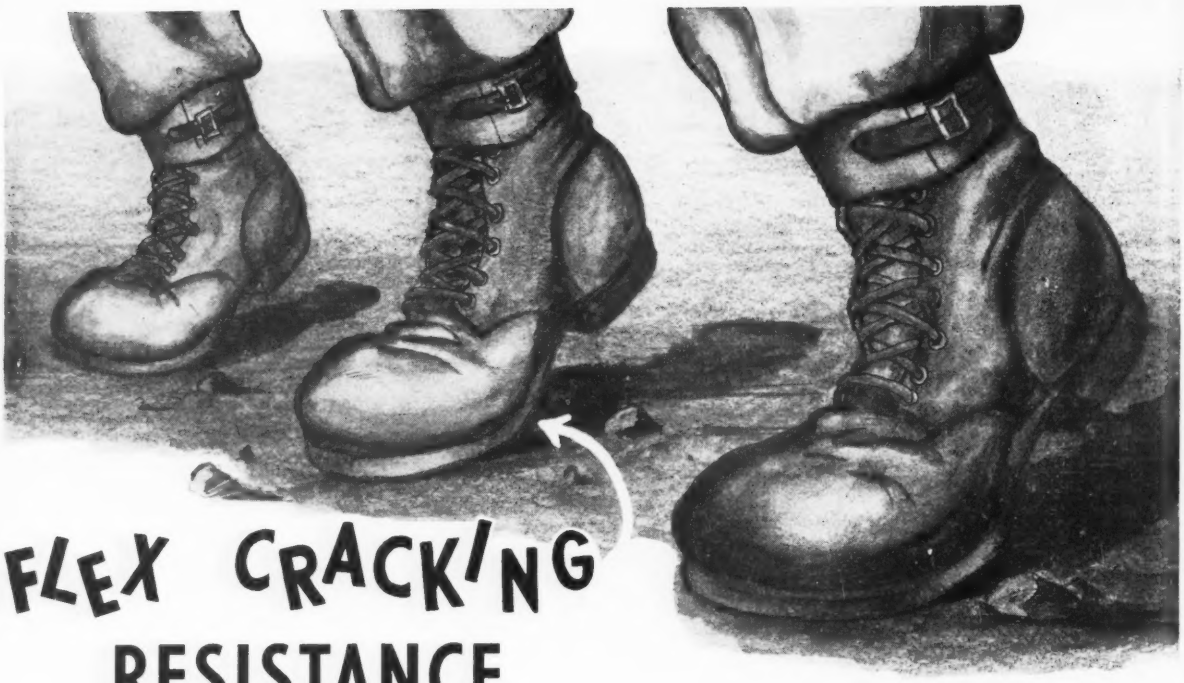

FLEX CRACKING RESISTANCE for ARMY COMBAT SHOES

PEQUANOC RECLAIMED RUBBER No. 2500

Test data indicate this compound to be well within the quartermasters' specifications for soles of Army combat shoes.

Write for samples of Pequanoc reclaim to meet your particular requirements.

ARMY COMBAT SOLE-MILS 10047

GR-S	32.5
2500 Reclaim	22.0
Carbonex S	4.0
Staybelite Resin	2.0
Zinc Oxide	1.7
Paraffin Wax	.6
Mineral Oil	1.7
M.P.C. Carbon Black	32.0
Stearic Acid	.8
MBTS	.8
DOTG	.3
Anti Flex Cracking Antioxidant	.6
Sulfur	1.0
	100.0
Shore A Hardness	80.0
Bureau of Standards Abrasive Index	62.0
Ross Flexing after 24 hrs. aging at 212° F.	.80 Max
Cure 8 mins. at 320° F.	
Approximate lb. cost	$0.165
Specific Gravity	1.23
Approximate volume cost	$0.203

Pequanoc Rubber Co.

MANUFACTURERS OF RECLAIMED RUBBER

MAIN SALES OFFICE and FACTORY: BUTLER, N. J.

When it's PELLETEX you KNOW...

Heel and Sole Processing is Easy

Heel and sole rubber compounding is far easier with PELLETEX on the job. The old problem of how to balance the quality desired against cost and processability finds a modern answer in a PELLETEX application.

Manufacturers prefer PELLETEX for the filler, because it has all the essentials necessary for longest-term, quality service. PELLETEX gives soles and heels just the right degree of abrasion resistance, tensile strength, aging properties, and "snap" for constant flexing. There isn't any other filler able to match the consistent, superior performance of PELLETEX SRF carbon black.

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Raw Materials Company, Boston
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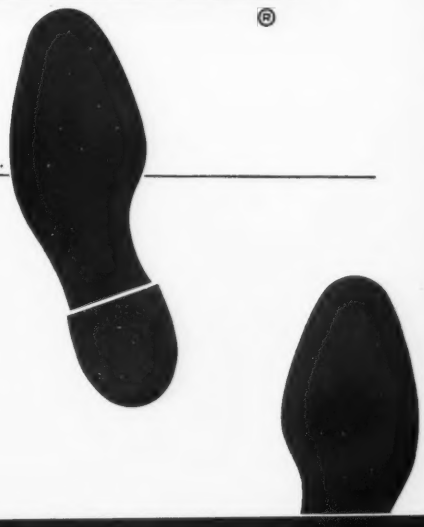


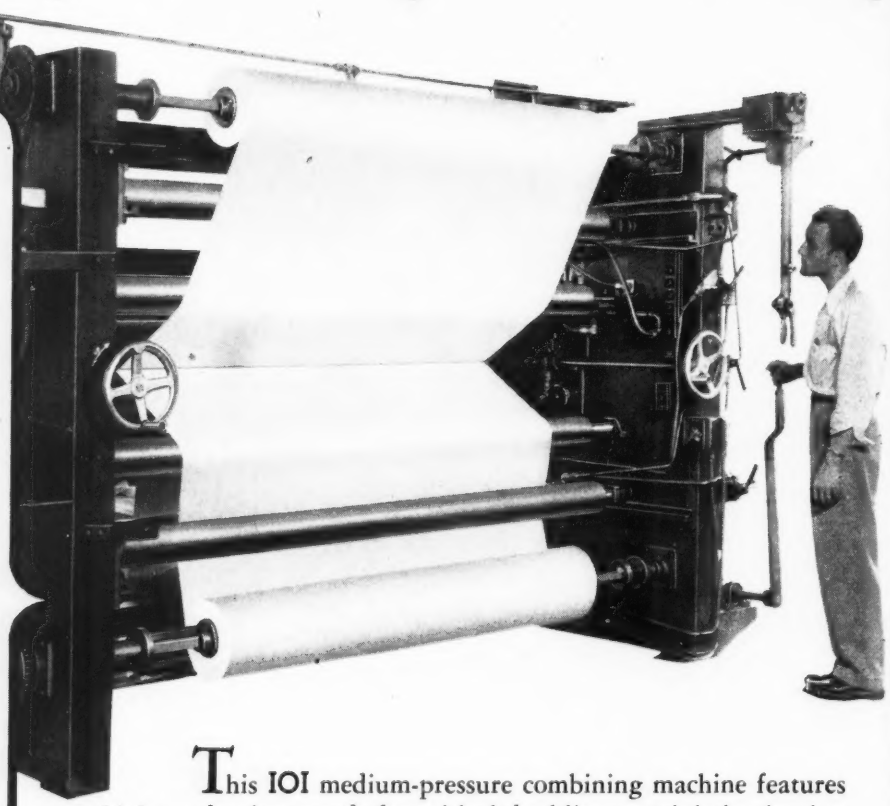
Designed and Built by IOI to improve your Combining... Doubling... Laminating

WEB to WEB

In Double or Triple Combinations or Laminations

At Light to Heavy Pressure

At true Constant Tension and Variable Speeds



This IOI medium-pressure combining machine features high production speeds for critical doubling or triple-laminating operations. It is available in a variety of face widths, ranging from 36 to 96 inches. The machine pictured has a 90 inch face width.

Sandwich thickness is accurately controlled by micrometer roll spacers. All unwinding and windup heads are driven at true constant tension by a sensitive, variable-volume, variable-pressure fluid drive. Threading speeds down to 12 inches per minute are provided, as well as a reverse drive for easy stock handling and triple combining.

Lateral register is built into each unwinding head. Adjustable edge slitters are also incorporated. The unit will handle previously coated webs of pressure-sensitive materials. It can be used in conjunction with IOI fusing equipment for thermo-setting vinyl-based and other types of adhesives.

Variations of this machine's basic design are available for any roll face, operating speed or combining pressure.

An **IOI** engineer will be glad to show you how this machine can be applied to your particular processing requirements. Write on your business letterhead for further information.

INDUSTRIAL IOI OVENS, INC.

IOI ENGINEERING VERSATILITY

13825 TRISKETT ROAD CLEVELAND 11, OHIO

STABELAN G-1

(100% ACTIVE PASTE FORM) — for improved

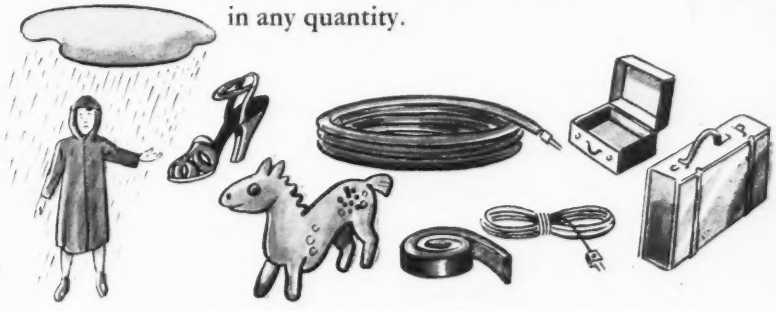
HEAT and LIGHT STABILITY in your VINYL PRODUCTS

EXTRUDED or INJECTION MOLDED FORMS . . . ✓

CALENDERED FILMS . . . ✓

CAST DISPERSIONS . . . ✓

• STABELAN G-1 is a new stabilizer in paste form (100% active) that will bring greater heat and light stability to your polyvinyl chloride resin products — molded forms, calendered films or cast dispersions . . . It will prevent discoloration during fluxing or fusion at processing temperatures as high as 350° F., or in the production of clear or pigmented films on the calender or cast from dispersions . . . It will appreciably retard breakdown under prolonged heat aging and provide greater resistance to ultra-violet light, making possible the production of films of greater transparency and life . . . STABELAN G-1 is an all-purpose stabilizer, now available in any quantity.



THIS NEW MEMBER OF THE STABELAN FAMILY TAKES ITS PLACE WITH . . .

STABELAN XL — (Powder) Non-toxic, for limited heat stability, excellent light stability, translucent stocks.

STABELAN E — 100% active paste form, for utmost heat and light stability in high clarity film and sheet.

Write for bulletin giving complete technical data

HARWICK STANDARD CHEMICAL CO.

AKRON, OHIO

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BELT FLEXING MACHINE

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All of these well known organizations have displayed their confidence in our engineering, production and service facilities, by allowing us right to manufacture equipment or utilize tests originated in their laboratories for the advancement of the science of evaluating rubber and elastomeric materials. Our 50 years experience is available for assistance in solving your testing problems.

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MOONEY VISCOMETER
STATE-OF-CURE TESTER (T-50)
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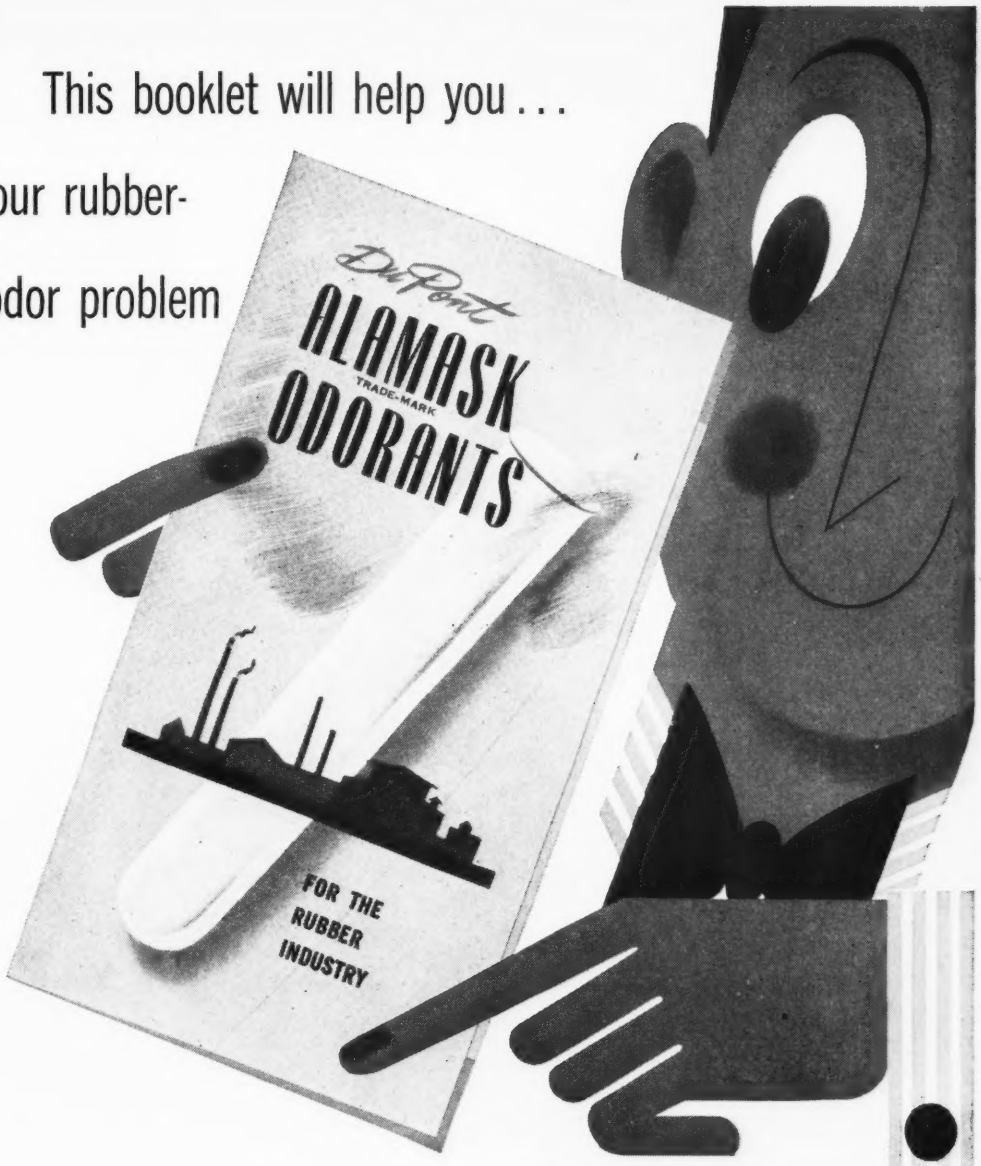
* The use of the name of a government agency does not necessarily constitute an endorsement.

REQUEST CATALOG 50

SCOTT TESTERS, INC., 90 BLACKSTONE ST., PROVIDENCE 5, R. I.

Scott Testers — Standard of the World

This booklet will help you . . . with your rubber-odor problem



Odor appeal can easily make the important *selling* difference in your rubber products. The proper odorant, too, can improve community relations by ending unpleasant odors from factory wastes. Whatever your problem, you won't want to miss the new booklet, *Du Pont "Alamask" Odorants for the Rubber Industry.*

This booklet describes many types of "Alamask" odorants and suggests their use and application . . . in latex products, dry rubber, adhesives, elasto-plastics and for plant odors.

Du Pont **Alamask** Odorants

TRADEMARK

DU PONT

REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

Why not send for your copy of this informative booklet today? If you have a particular problem, tell us what it is, and we'll be glad to help. Just use the coupon below.

E. I. du Pont de Nemours & Co. (Inc.)
Organic Chemicals Department I-11
Aromatics Section, N-8452, Wilmington 98, Delaware

☐ Please send a copy of "Du Pont 'Alamask' Odorants for the Rubber Industry."

☐ May I have a special recommendation for our odor problem, which is (describe briefly) _____

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

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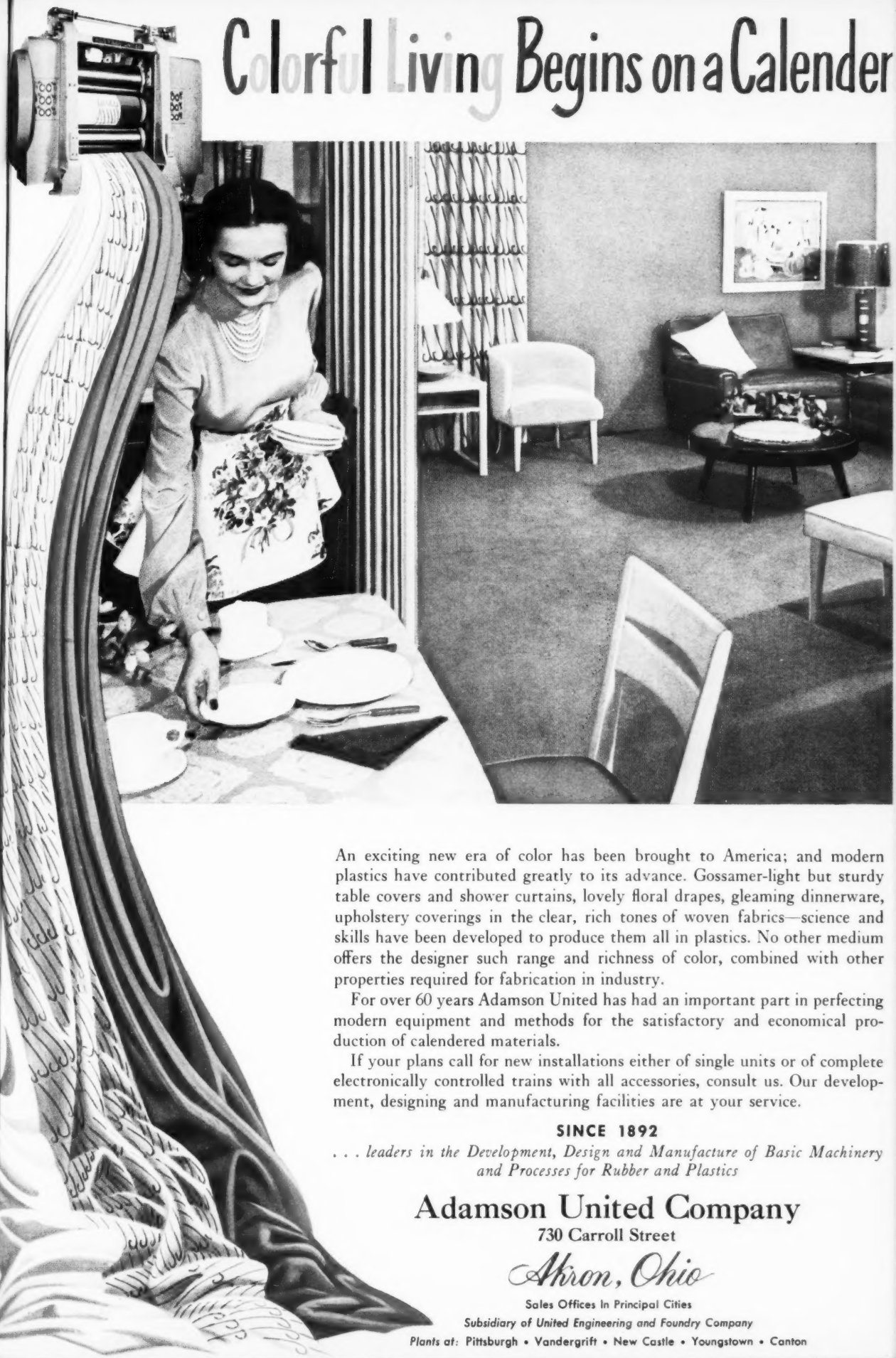

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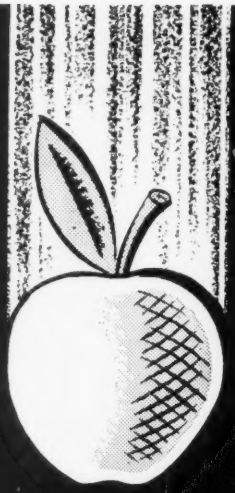

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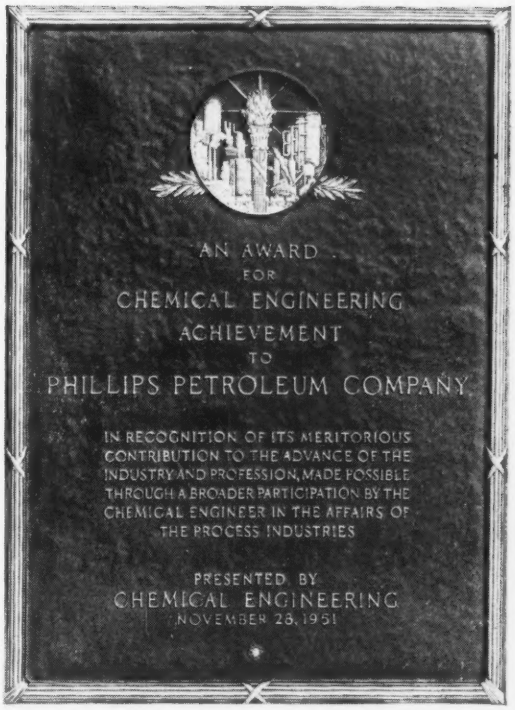
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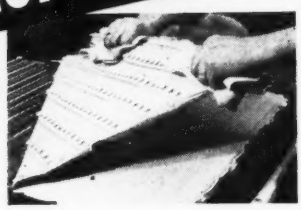

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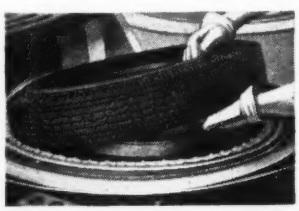

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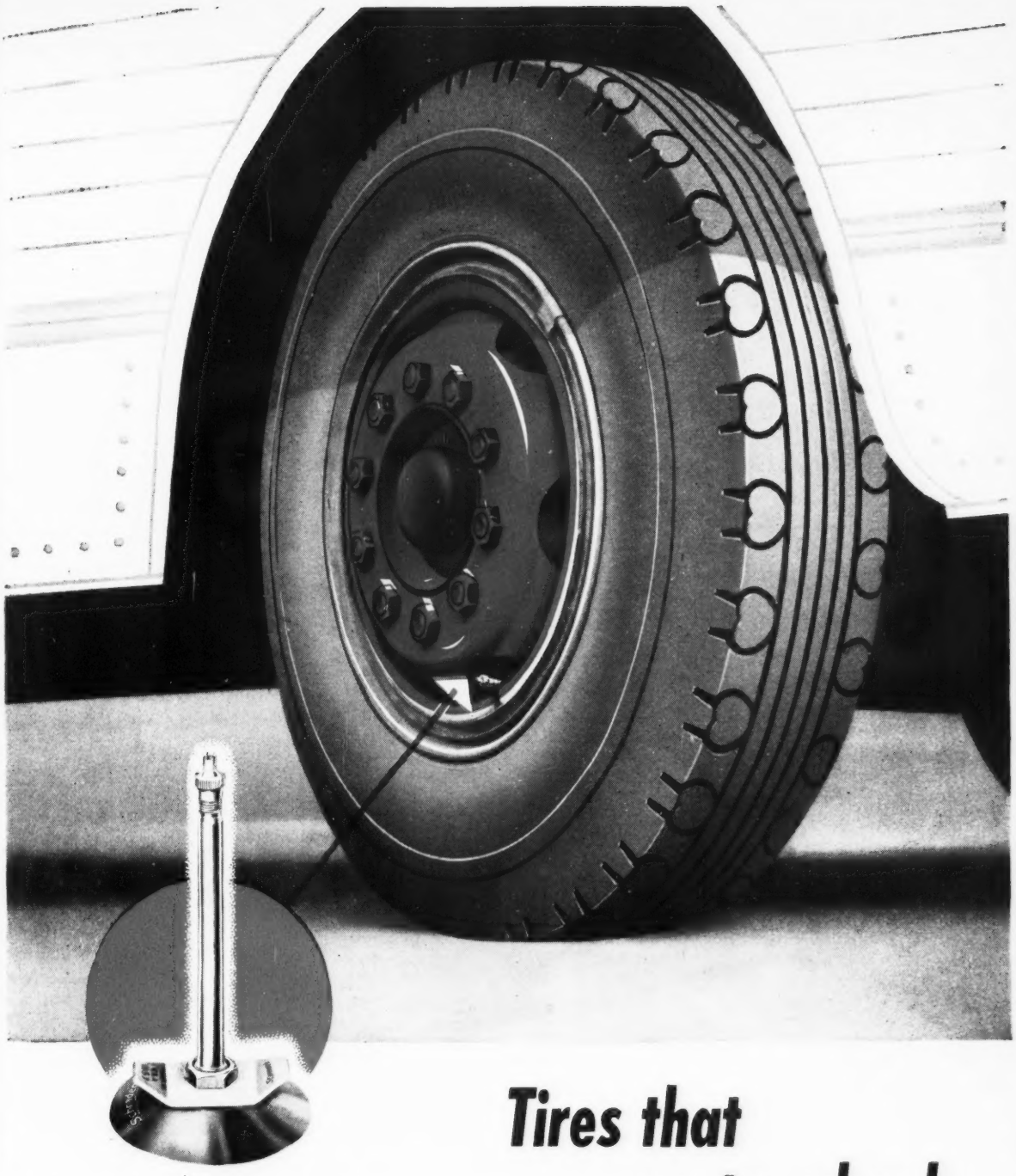

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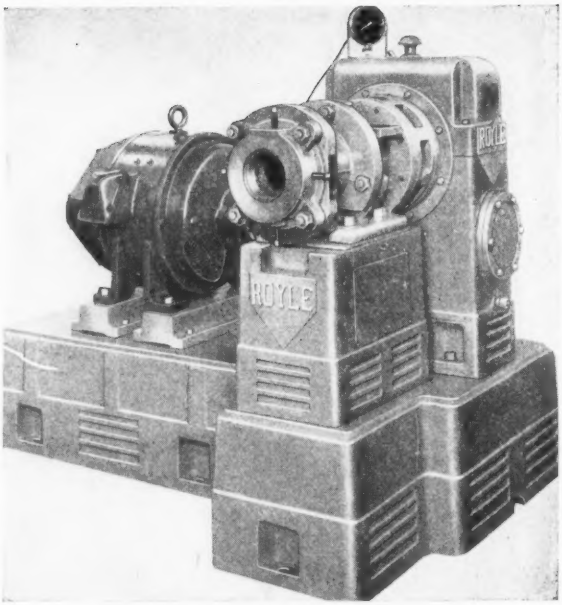

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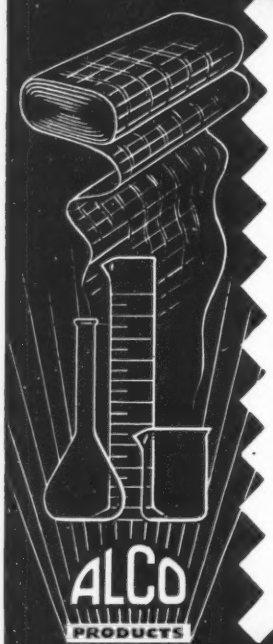

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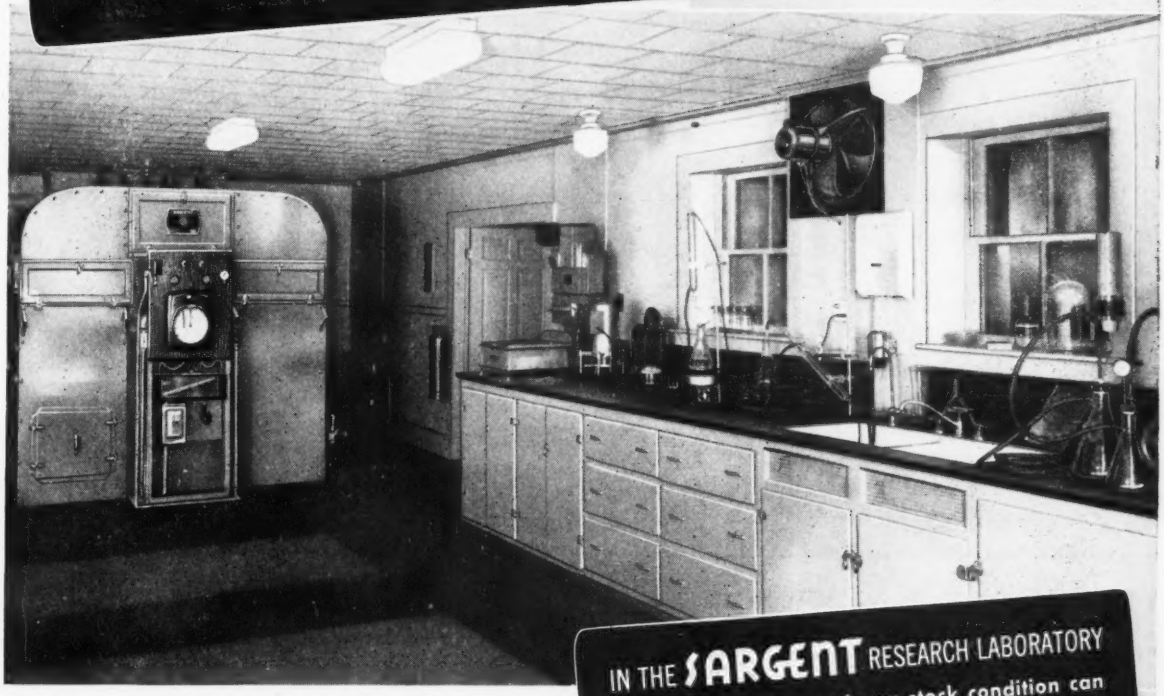

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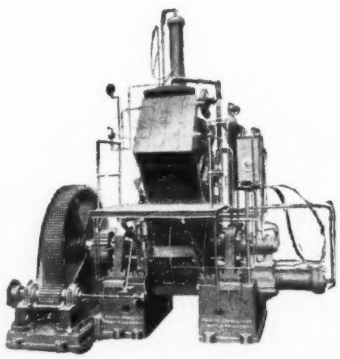

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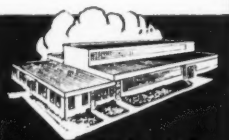

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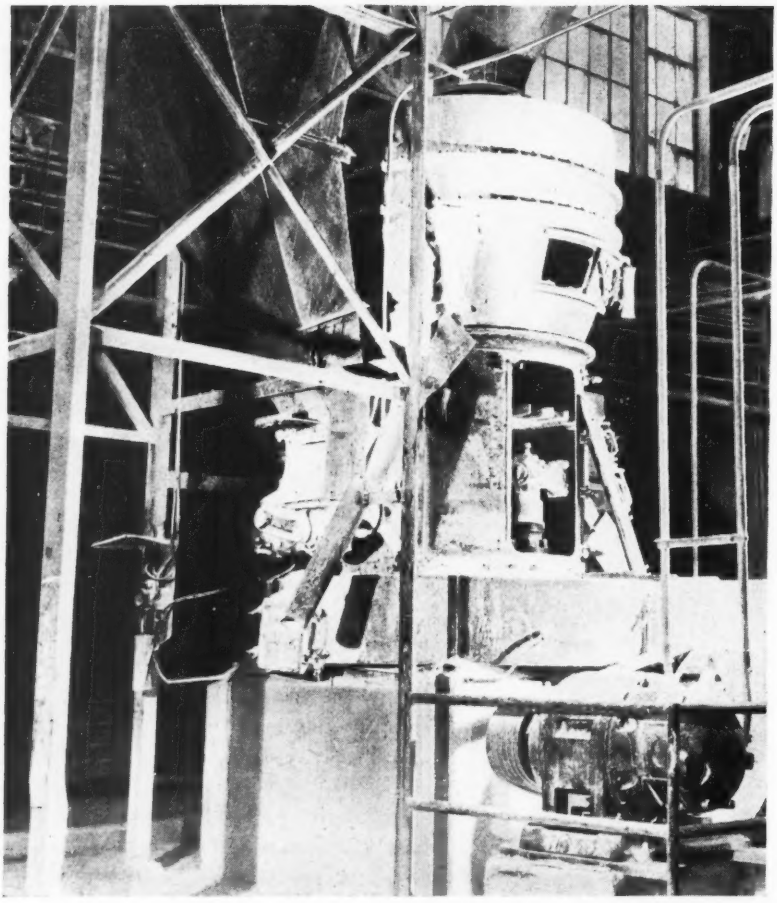

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NOVEMBER, 1951
Vol. 125—No. 2

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VOL. 125—NO. 2 NOVEMBER, 1951

Mechanical Rubber Goods—With Special Emphasis on Latest Designs and Testing Methods for Automotive Parts[1]

F. L. Haushalter[2]

THE application of mechanical rubber goods to automotive equipment includes various types of vehicles —passenger cars, trucks, both commercial and military, all types of road grading machinery, military tanks and armored cars, as well as special-purpose vehicles. The job of designing automotive rubber parts to meet the requirements of long-time service on this variety of vehicles is usually placed in the hands of engineers of the rubber industry, but they must work in close cooperation with the chemists who compound the rubber, in both research and development laboratories. Unless the engineer is familiar with all the physical properties of the compounds he expects to use in functional parts, he will sooner or later get repercussions from the automotive engineers with whom he works. This situation exists whether the physical properties involved are those at elevated temperatures or those at temperatures as low as —65° F.; the latter has been set up by the United States Ordnance Department as a possible operating temperature for military vehicles.

Rubber Bushings and Motor Mounts

Those who set up the specifications for functional rubber parts for automotive use are at times doubtful whether or not the requirements of joint specifications of the Society of Automotive Engineers and the American Society for Testing Materials placed on the blueprint will guarantee satisfactory performance in service. There is a definite trend to place more on the blueprint than the SAE-ASTM nomenclature. For example, the U. S. Ordnance Department uses rubber torsion bushings in all tracks of combat vehicles. These are of the doughnut type, as shown in Figure 1, and are pressed into the tubular openings of the track shoes by forcing them through a reducing die with the aid of vaseline. The rubber is placed under a radial compress of about 35% by this procedure. After 24 hours the vaseline is absorbed sufficiently so that the shaft or pin can be twisted through an angle of 45 degrees and will return to its original position within two degrees. The specification for the natural rubber compound used in these bushings calls for a tensile strength of 3500 p.s.i.; an elongation of 500%; a modulus of 2000 p.s.i. at 400% elongation, compression set of 10% maximum according to ASTM D395-49T, Method B; durometer hardness of 60-67; and adhesion pull of 33 pounds per inch of width average on the doughnut on a 1¼-inch diameter pin when pulled in a specified manner at room temperature.

This part of the specification does not qualify all items submitted for acceptance. It is, in fact, only an acceptance specification for the parts produced once the manufacturer has qualified his product in actual tracks tested on applicable vehicles under specified conditions of terrain, at specified speeds, and for a specified distance, without failure of any kind. Furthermore nothing is said about performance at temperatures down to —65° F.

During World War II the rubber industry was faced with the task, even as we are again now, of producing vast quantities of rubber-bushed tracks for combat vehicles, some with steel on the road, some with rubber on the road, and some of the rubber-backed steel grouser type. Up to that time all bonding of rubber to metal on Ordnance parts was by the brass-plate method. Companies not having brass-plate facilities had to be given orders for Ordnance parts such as tracks, bogie wheels, track support rollers, engine mountings, rubber gudgeon bushing, etc. Some small companies had already learned

[1] Presented before the Rubber Division, Chemical Institute of Canada. Kitchener, Ont., Canada, June 15, 1951.
[2] Automotive engineer, Firestone Industrial Products Co., Detroit, Mich.

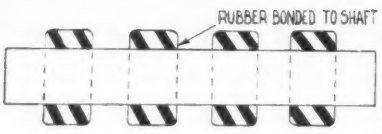
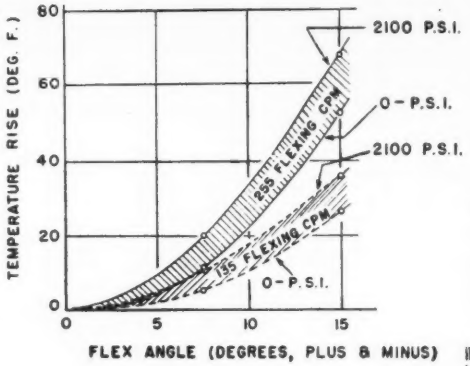
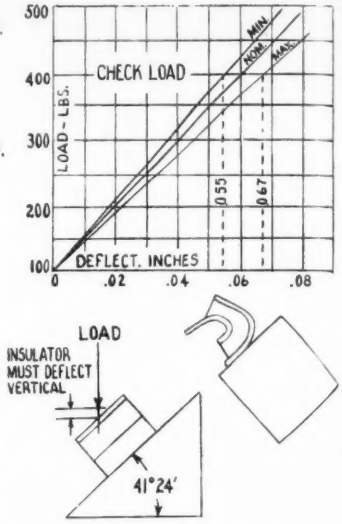


Fig. 1. U. S. Ordnance Track Bushing—Doughnut Type



(Right)

Fig. 2. Rubber Torsion Bushings — Effect of Flex Angle on Temperature Rise when Tested at Two Different Speeds and Two Different Loads



(Right)

Fig. 3. Ford Front Engine Mounting and Deflection Specification Curve

to obtain high bond strength of rubber to metal by the use of cements of the chlorinated rubber type, but no one in the whole rubber industry had any reliable fatigue flexing data taken at very low temperatures on any kind of rubber-to-metal adhesion.

If a tank sets out all night, or for days, at —40° F., what will happen to the rubber track bushings when the driver suddenly starts up the vehicle? We found the answer to this question in a test set up in the cold room of a large automotive company in 1943. The flexing apparatus was placed in the cold room at —40° F. and was run for five minutes at a time, then cooled down to —40° F. before the start of the next five-minute cycle. We were interested in the number of starts, not the number of millions of cycles of continuous operation that the part would operate satisfactorily under conditions simulating those on a medium tank at temperatures as low as —40° F. It has since been found by similar tests that adhesion of rubber to metal with cements such as Firestone Loxite is also satisfactory at low temperatures. When I say that these bonds are satisfactory, I assume that the best known technique is used in cleaning the metal surfaces applying the base cement and the cover cements, and that the cements are fresh and maintained at recommended temperature with proper agitation.

In connection with the work on rubber torsion bushings, even fatigue flexing at room temperature requires thought concerning testing conditions which might be set up as a qualifying laboratory specification. Figure 2 shows that heat builds up in the test samples when flexed at two different speeds, at various angles under zero load, and also with a load of 2100 p.s.i. on the projected area of the rubber. Considerable thought, therefore, has to be given to the conditions of fatigue testing to be sure the parts do not fail from excessive heat, when such heat is not encountered in service.

The real test of rubber-to-metal bonding is not necessarily a straight pull test on a strip ½- or 1-inch wide, important as this test is as a day-to-day check, but is a life test under conditions of vibration. We have found the Sonntag vibration fatigue testing machine most useful for testing engine mountings used in straight or partial shear.

Figure 3 shows the Ford front engine mounting made of rubber bonded to two metals. These mountings are used at a 41-degree angle from a straight shear position. Comparative tests were run on test cars operating over the so-called Belgian Block test course of the Ford Motor Co., where a very rough ½-mile strip is driven over at 20-25 miles an hour. On such a course a front suspension may fail in 200 to 300 trips over the blocks. We measured the extreme amplitudes obtained in the rubber mounting by placing scratch graphs on the car. (Scratch graphs are obtained by fixing a pencil on the engine block or clutch housing and having it mark the engine movement on a pad of paper fixed to the frame or frame crossmember.)

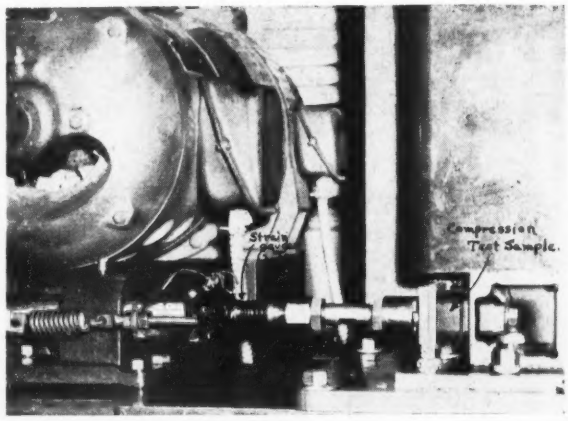


Fig. 4. Close-Up View of Muller Machine for Testing Buick Motor Mounts—Showing Sample and Strain Gages

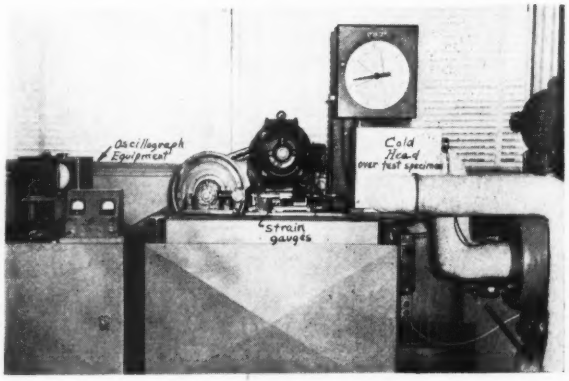


Fig. 5. Muller Machine Showing Installation of Refrigerated Air Chamber around Sample

Amplitudes of ¼-inch were obtained in the above-mentioned test so that similar amplitudes for the mounting were set up on the Sonntag machine operating at 1,800 r.p.m. and maintaining the load originally imposed to give the ¼-inch deflection. Needless to say, our compounders greatly improved our rubber-to-metal bonds during this period of testing. Ford engineers at

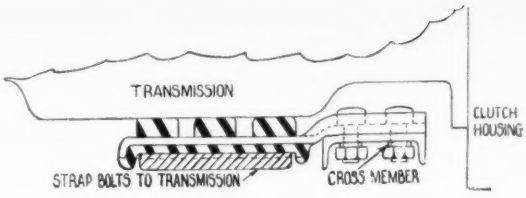


Fig. 6. Rear Engine Mounting—Compression Type (Waffle)

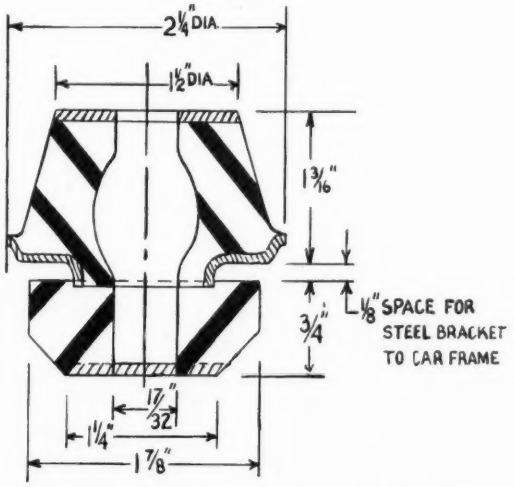


Fig. 7. Front Engine Mounting—Biscuit Type

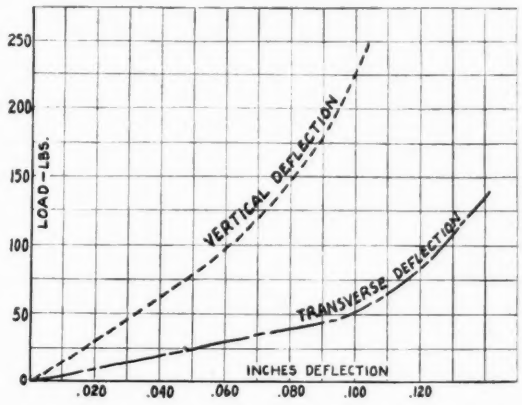


Fig. 8. Deflection VS. Load in Two Planes for Biscuit-Type Mounting

that time wanted to specify brass-plate adhesion only, and we had to provide the proof that the Loxite cement method was just as good.

Natural rubber was used on all the track bushings and Ford front motor mountings mentioned above. Figure 3 also shows the type of curve automotive engineers are beginning to place on the specification blueprints for such items. The effect of vibrations transmitted to the automobile driver has resulted in the demand by automotive engineers that static load deflection of a rubber motor mounting be held within specified limits. On this particular Ford front motor mounting we are held to a deflection range of 0.055- to 0.067-inch under 400 pounds' load, when the mounting is tested at the 41-degree angle.

An effort also is being made to set up requirements for dynamic modulus and resilience (as determined by forced

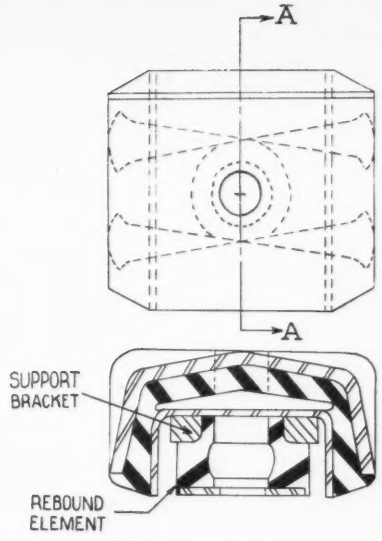


Fig. 9. Shear-Type Mounting with Rebound Control

vibration methods) of the rubber compounds used for such things as engine mountings, and in a few years it is fully expected that the joint committee of the SAE and the ASTM on automotive rubber will have recommendations for just such a specification. The section on automotive vibration insulators headed by J. F. McWhorter, Ohio Rubber Co., has been doing a tremendous amount of work on the evaluation of the dynamic modulus of rubber compounds, and one of these days functional rubber parts subjected to dynamic loads will have to meet a dynamic modulus requirement instead of a static load-deflection limit.

Lloyd Muller, staff engineer of Buick Motor Co., has developed during the past several years a definite method of measuring dynamic modulus of rubber compounds by use of an oscillograph and strain gages. His apparatus is shown partially in Figure 4. Work is being done at present to correlate his results on rubber in compression, as tested on the Muller machine, with results on shear mountings set up on a Sonntag machine.

We now have a test program set up in the laboratory to test synthetic rubber track bushings under fatigue conditions, both at room temperature and at temperatures down to —65° F. We are also running in our own laboratory a series of tests on shear-type mountings on the Sonntag vibration machine. By placing an insulated head over the machine for circulation of refrigerated air, similar to that shown over the test specimen on the Muller machine in Figure 5, we are able to reduce the temperature of the test sample to —65° F. Tests are being made on various low-temperature polymers and various types of rubber to metal bonding.

We usually recommend the use of rubber in compression for rear engine mountings, with the mounting located near the rear of the transmission, as shown in Figure 6. Such a mounting also experiences shear action when the engine moves about its center of oscillation.

On some cars equipped with automatic transmissions, we are forced to use neoprene in the rear engine mounting, because of oil leakage. We were at first concerned about the possibility of excessive stiffening at low temperatures, but tests in a cold room on a compound made of Neoprene Type W showed that the small amount of stiffening that developed was not objectionable and that it disappeared after the first mile of operation of the car.

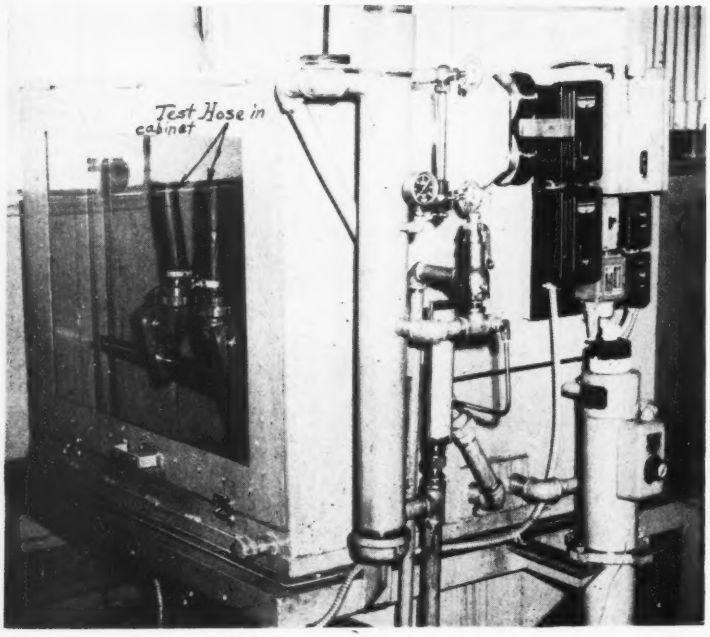


Fig. 10. Apparatus for Testing Radiator Hose under Conditions of Flexing and Internal Pressure and at Elevated Temperatures

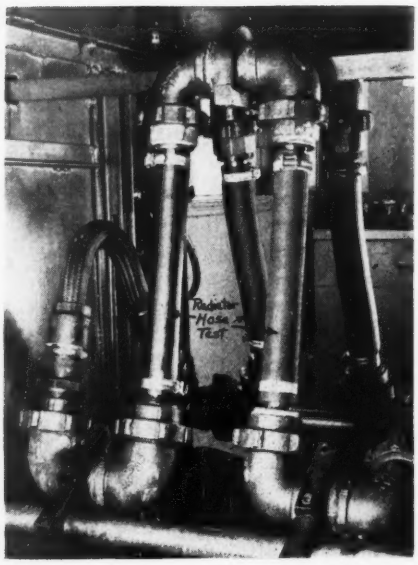


Fig. 11. Close-up of Hose Testing Apparatus Showing Details of Hose Mounting and Testing

The biscuit-type mounting shown in Figure 7 has also been used to advantage as a front engine mounting. This design incorporates a rebound element which insures some limits to deflection in different planes. The curve in Figure 8 shows a change in the rate of deflection with load after this rate followed a straight line for some distance. For a shear-type mounting the curve would be a straight line over the entire range, as was shown earlier in Figure 3.

Figure 9 illustrates another shear-type mounting which includes rebound control. Mountings with rebound control are particularly recommended for military off-the-road vehicles since they eliminate the danger of failure inherent in shear-type mountings in such applications, while still giving good vibration isolating characteristics. To show how critical the load rates in various planes are, we recently developed front engine mountings of the biscuit-rebound type which give ¼-inch transverse deflection, 0.110-inch vertical deflection and hold fore and aft movement to 0.067-inch under 250 pounds load, when used in conjunction with a waffle-type rear mounting. A front mounting of this type was found necessary; otherwise severe reactions were experienced in the driver's seat when the car was run over a certain type of rolling road that introduced a lateral shake into the car.

Radiator Hose

In connection with the manufacture of radiator hose, we compared the relative merits of GR-S, neoprene, natural, and butyl rubbers. We were guided in our selection of the best rubber to use by thorough tests of the aging and flexing resistances of the several rubbers. Since some cars now operate with a pressure of 14 p.s.i. in the cooling system, and even higher pressures may be used if radiators are reduced further in size because of the shortage of copper, we set up a flexing test with the hose under internal steam pressure in a heated compartment in order to obtain an estimate of the life of a given hose compound in actual service. We prefer to make radiator hose with a neoprene tube and a good GR-S cover; the neoprene provides satisfactory resistance to the 101 anti-rust solutions on the market. A GR-S, as well as a butyl, compound for both the tube and the cover appear to give excellent service if the liquid in the car radiator contains very little oil. Figure 10 shows the apparatus used to test radiator hose under pressure and at elevated temperatures. The hose, under specified internal steam pressure, is flexed 20 times a minute. Flex cracking and softening of the cover stock with subsequent loosening of the hose clamps may be observed through a glass window in the front of the apparatus. Figure 11 is a close-up of the same apparatus showing the details of the hose mounting and testing equipment. Temperatures as high as 250° F. can be maintained inside the cabinet.

Fan Belts

There is a definite trend toward ⅜-inch wide fan belts for both passenger cars and trucks. Exhaustive tests show that this width belt gives longer life than the wider belts when used with the recommended h.p. rating and under proper tension, since the ⅜-inch belt heats up less, when flexed, and slips less if the proper tension is initially applied. We still use neoprene in all ¾-inch wide belts, together with rayon cord. We have belts of GR-S construction in the process of test, however, that look very promising. There is, of course, a limit to the h.p. rating of a single ⅜-inch belt. Installation on some trucks requires dual belts in order to carry the h.p. load. Figure 12 shows a fan belt testing machine used to measure slip under various water brake loads and with various belt tensions.

Window Seals

A change in passenger-car design in 1948, which increased the amount of exposure of the window seals and at the same time increased the number of points where the rubber in the seal was under tension and exposed to sunlight, necessitated the development of compounds of increased ozone resistance and apparatus of improved efficiency for testing these compounds. One company continuously runs laboratory tests in ozone and under an ultra-violet arc on window seals bent around a two-

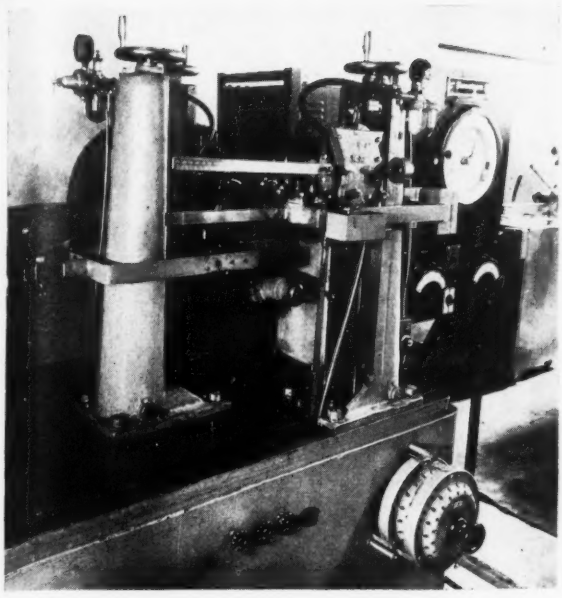


Fig. 12. Apparatus for Testing Fan Belts, Which Includes Water Brake with Counter-balanced Arm and Dial Gage Slip Meter

inch-diameter mandrel, and takes pictures of the cracks developed after 70 hours of exposure. Compounds are classed as 0, 1, 2, 3, etc., with samples rated between 2 and 3 considered acceptable. One of the problems in making this test is to duplicate conditions inside the test apparatus where the samples are subjected to ozone. A temperature of 150° F. is maintained, and air circulation is controlled closely in order that test conditions can be closely duplicated. Ozone concentration in the air used is checked by the usual titration method and seems to insure fairly uniform results over extended periods.

Elaborate test programs to try to correlate laboratory tests with outside sun exposure tests in Florida and California have been under way for many months. Close correlation has not been obtained, perhaps owing to variations in the so-called "haze" intensity in California or the coolness of the winter in Florida. The Kemp-Crabtree type of ozone testing equipment appears to give the most satisfactory results if uniform air circulation through the box and over the test samples can be assured.[3]

The section on ozone testing of the SAE-ASTM Committee on Automotive Rubber has worked out a triangular test strip for studying the cracking phenomena so that the shape of the cracks or sharp lips on them do not produce misleading results. Ozone cracking is definitely affected by stock processing details such as time of milling, relaxation of stock between time of milling and the tubing operation, also between time of tubing and curing, as well as aging of the test samples between curing and testing. Blooming of waxes put in the compound to protect the rubber, proceeds slowly and the rate varies with the kind and the amount of wax.

A triangular test sample bent around a two-inch mandrel is shown in Figure 13. The cracks are typical of the results obtained after 70 hours' exposure under the ultra-violet arc for classifications 0, 1, 2, and 3.

Spring Pads, Axle Bumpers, Etc.

A lot of compound development work was necessary in connection with the rubber spring pad used to insulate the rear leaf springs from the axle housing. (See Figure 14.) To insure that the pull-down bolts do not get loose over a long period of time, the compound used must not relax more than 500 pounds from the 4,200 pounds developed from the original load impressed on it, when tested for a one-hour period. When burlap was used in connection with the installation of this part, the burlap helped keep the rubber from flowing, but burlap breaks or loosens in time, also it is now difficult to procure, so that a stock had to be developed that would meet the above specifications without the use of burlap.

Fig. 13—Ozone Test Rating System—Triangular Test Piece —Examples of Cracking Classified as 1, 2, 3, and OK

The need now to use GR-S in axle bumpers has also required a lot of compound development work, for the bumpers must meet a pendulum impact test to determine whether they will crack or split. Figure 15 shows the apparatus used. The hammer delivers 600 inch-pounds of energy per blow; the hammer drops once and is caught and raised again to full height. Cold GR-S rubber is far superior to regular GR-S for this item. Cold GR-S rubber on rubber chevron tracks for U. S. Ordnance tanks gives twice the life tracks made with regular GR-S, in operations over rugged terrain.

Figure 16 shows an interesting development of a rubber piano-hinged accelerator pedal where the rubber in the hinge is soft and not adhered to the immediate metal hinge.

Rubber Torsion Springs

All load-carrying rubber elements must be analyzed thoroughly from the standpoint of both stress and strain in order to be sure of their successful application. Much work has been done on rubber torsion springs for suspensions of vehicles. Here the rubber is bonded to an inner shaft and an outer split shell, as shown in Figure 17. Thousands of such springs were used with great success on U. S. amphibious vehicles in World War II.

[3] (Since Mr. Haushalter's paper was given, a new ozone testing apparatus has been described by two other workers in the Firestone company, E. W. Ford and L. V. Cooper, in the September and October issues of India RUBBER WORLD.—EDITOR.)

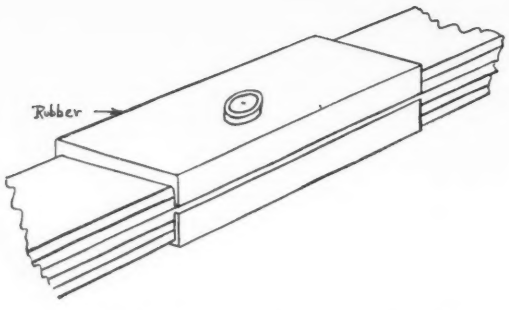


Fig. 14. Leaf Spring Rubber-Pad Rear Axle Insulator

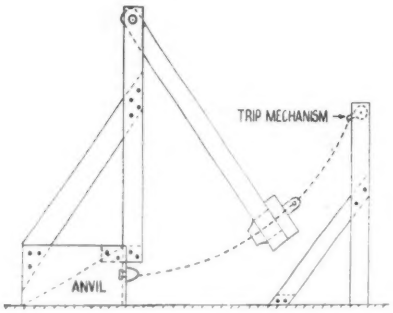


Fig. 15. Axle Bumper Impact-Type Testing Machine

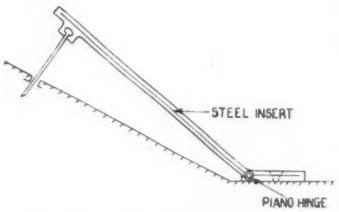


Fig. 16. Rubber Encased Piano-Hinge Type of Accelerator Pedal

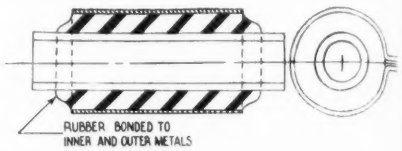


Fig. 17. Rubber Torsion Spring—Single Split Outer Shell

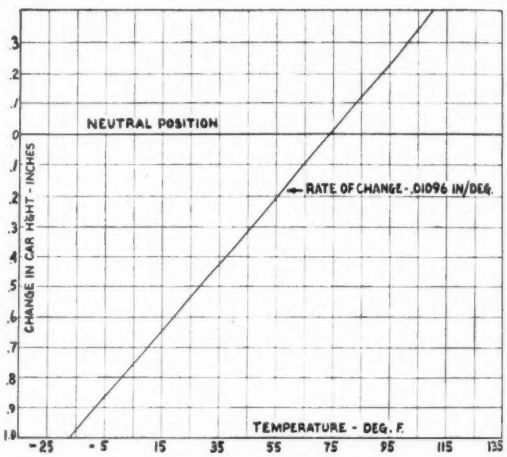


Fig. 18. Joule Effect on Firestone Rotoflex Torsion Springs with 14-Inch Arm

Fig. 19. Effect of Reduced Temperature (—4° F.) on Height of Car Equipped with Firestone Rotoflex Torsion Springs

If the outer shell is fixed and an arm attached to the shaft, a torque curve, as in Figure 18, is obtained.

Had the Tucker cars ever been produced in volume, they would have been equipped with rubber torsion springs both front and rear.

It was recently announced that the Le Sabre car, designed by Earle of General Motors styling division, has rubber torsion springs as the front suspension. On each side of the car are two rubber bushings, one above the other, with an arm projecting from each to form a parallelogram of motion of the linkage attached to the front wheel. The rubber winds up and unwinds as the car passes over road irregularities. These springs can be designed by exact formulae; we must work closely with the compounders, however, in order to get compounds of low permanent set, for the problem is one of car height change over long periods of time, and the smaller the car's clearance from the road, the more serious the problem is.

Also, there is the problem of how high the car will ride in hot weather and how low in very cold weather because of the effect of temperature on rubber in torsion or shear. Research compounders have practically licked all complaints except those due to the Joule effect in rubber where the modulus of the rubber continues to increase, when heated, and diminishes when cooled. The curve in Figure 19 shows how the height of the passenger car equipped with rubber torsion springs changed when the temperature was reduced from 80 to —4° F. After about 100 hours at —4° F., however, the height of the car remains constant, showing that changes in this particular compound of natural rubber did not cause a continuous drop in car height as some other compounds did.

Speaking from my own experience, I drove a 1946 model car, equipped with rubber torsion springs front and rear, for 1½ years and for a total of 56,000 miles and am satisfied that they can be successfully applied to vehicles with their chief advantage over steel springs being their noise insulating value on rough roads.

Summary and Conclusions

Recent design of automotive rubber parts made from natural and increasing amounts of synthetic rubbers has been accompanied by a trend toward the narrowing of specification limits for the compounds used and the demand that service life, particularly for military applications, be adequate at temperatures as low as —65° F.

More critical specification requirements for automotive rubber parts, such as those for dynamic modulus and resilience of compounds used for motor mounts, are considered to be a distinct possibility in the not-too-far-distant future.

Radiator hose must now be capable of use under internal pressure of 14 p.s.i. or more, in the presence of varying amounts of oil and under conditions of flexing at elevated temperatures. Window seals require increased resistance to ozone cracking, axle bumpers of synthetic rubber increased resilience, and rubber torsion springs increased resistance to permanent set and change in modulus over a wide range of temperatures.

The Molecular Weight of Guayule Rubber as Influenced by Extraction and Processing Treatments[1]

J. W. Meeks[2] and I. C. Feustel[2]

THE molecular weight of the rubber hydrocarbon contained in guayule shrub (*Partenium argentatum*, Gray) has been found, as indicated by reduction in the viscosity of benzene solutions, to be appreciably lowered as the result of certain treatments involved in the recovery of rubber from the shrub.[3] Since the physical properties of guayule rubber have been observed in this laboratory to be influenced adversely by the same or similar treatments,[4] a study was undertaken to determine the relative extent of molecular-weight degradation that occurs in the several steps of the pebble-milling extraction process and related treatments. Viscosity measurements are believed to serve a very useful purpose in connection with the development of new or improved extraction and processing procedures for producing guayule rubber of uniform high quality.

Recovery of Rubber From Guayule

In the pebble milling process, as used in this study and as described by Taylor and Chubb (1),[5] freshly harvested guayule shrub is first parboiled 15 minutes and trommelled to remove leaves.

The defoliated shrub is passed successively through an ensilage cutter, a fly knife cutter, a roll crusher, and a hammermill. A slurry of the hammermilled material is then pebble milled for one hour in a 27-inch batch pebble mill. Crude rubber particles, commonly referred to as "worms," are recovered by flotation after dilution of the pebble-milled slurry. Rubber from the primary flotation is given a hydraulic pressure treatment (500 p.s.i. at about 185° F. for 90 minutes) to waterlog cork that accompanies the rubber. The cork is removed by secondary flotation. Scrub milling for 15 minutes in a pebble mill is used to effect further purification of the crude rubber from contaminating plant material.

The final step in the process is drying the wet rubber as skimmed from the final flotation after scrub milling. The "worms" are spread out upon drying trays with screen bottoms and placed in a through circulation drier heated with steam. The initial temperature is 100° F., which is raised stepwise at 25° intervals over a period of one hour until 200° F. is reached. At this point the tray is weighed and replaced in the drier for five minutes, then weighed again to determine constancy of weight. If a loss of weight is observed, drying is continued for such additional five-minute intervals as may be necessary.

Deresination

Normally, crude guayule rubber contains 20 to 25% acetone soluble substances collectively referred to as resin. In this study deresinated rubber was prepared as well as the resinous crude. One modification in the pebble milling process which yielded deresinated rubber comprised cold acetone extraction of the crushed and hammermilled shrub preceding pebble milling. The details of this procedure have previously been described (2). Another method used was acetone extraction of the resinous rubber "worms" after the scrub milling step. In this case the wet "worms" were treated with successive portions of fresh cold acetone with stirring until the resin content was reduced to about 1% to 2%, comparable to the resin content of rubber recovered from acetone-extracted shrub.

Application of Antioxidant

In some experiments PBNA (phenyl-beta-naphthylamine) was used as an antioxidant to protect the rubber during drying or storage. Application of this antioxidant was made to wet rubber "worms" either by spraying or dipping, using a solution of PBNA in acetone. The excess or loosely held water was first removed from the surface of the rubber by shaking and slightly squeezing the rubber mass. A fine spray of 5% solution was applied with a hand atomizer to all exposed surfaces of the rubber after spreading on the drying tray. An amount of solution corresponding to roughly 1% of PBNA on the basis of the dry weight of rubber was used. Evaporation of the acetone was rapid, and no difficulty was experienced in loss of solution by dripping. In the case of dip treatments, the rubber from which excess water had been removed was dipped into a 10% solution of PBNA in acetone. Each method resulted in the retention of approximately 1% of PBNA.

Experimental Procedures

Guayule shrub, variety 593, grown under dryland conditions near Salinas, Calif., was used. Unless otherwise noted, the shrub was six years old.

Sampling

Samples of shrub and of crude rubber "worms" were taken at various points in order to follow relative changes in inherent viscosity that resulted from extraction or processing. Shrub was sampled first after the coarse (½-inch) cutting following defoliation, because of the difficulties in obtaining a representative sample from whole shrub. For purposes of the present study, this sam-

[1] A contribution from the Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administation, United States Department of Agriculture, Washington, D. C.

[2] U. S. Natural Rubber Research Station, Salinas, Calif.

[3] Based upon unpublished information obtained by workers in this Bureau under the Emergency Rubber Project as well as upon results of current investigations.

[4] Unpublished data.

[5] Numbers in parenthesis refer to bibliography items at end of article.

ple was regarded as a control although it is probable that parboiling influences some changes in molecular weight. Samples of shrub were also taken after crushing and hammermilling. In all cases, riffling in a binary Jones divider was employed to collect representative plant materials.

Samples of crude rubber "worms" were collected by random grab sampling from the flotation tank after pebble milling and after scrub milling, and from the drying trays after completion of drying. In order to eliminate the effects of local differences in temperature, air circulation, etc., in the drier, three or more replicate samples were arranged in latin square positions (3) on the drying trays.

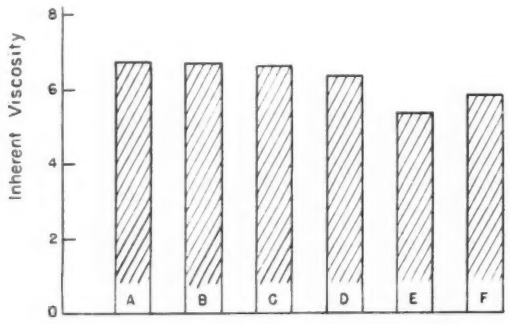


Fig. 1. Effect of Successive Processing Steps Involved in the Recovery of Resinous Guayule Rubber upon the Inherent Viscosity of the Rubber in Benzene Solution

A—Control (Plant Material Cut to ½-Inch)
B—After Crushing and Hammermilling
C—After Pebble Milling
D—After Decorking and Scrub Milling
E—After Oven Drying (without Added Antioxidant)
F—After Oven Drying (with Added Antioxidant)

Preparation of Benzene Solutions for Viscosity Measurements

Samples of crude rubber "worms" (25 to 30 grams, dry basis) were first extracted with cold acetone to remove resins and/or water, depending upon previous treatments. Extraction was conducted batchwise, using three charges of fresh acetone with frequent shaking over a two-day period. The extracted rubber was spread on a tray to dry at room temperature. Individual "worms" were, in most cases, well separated. A representative two-gram sample of the dried "worms" was placed into 200 milliliters of benzene and allowed to stand for three days, with occasional shaking. The solution was carefully examined for the presence of undissolved rubber, then centrifuged to remove all non-rubber benzene insolubles (mainly plant material). A 50-milliliter portion of the clarified solution was diluted to 250 milliliters to give a concentration suitable for the determination of rubber hydrocarbon by a bromination method (4). Further dilutions were made, usually 15 to 50 milliliters, to give a relative viscosity within the range of 1.2 to 1.4. Ordinarily this concentration varied between 0.05- and 0.06-gram per 100 milliliters of solution.

In the case of plant tissue, a sample of approximately 25 grams (dry basis) was extracted with acetone in a manner similar to that used for rubber "worms." After deresination and drying, the plant material was treated with 300 milliliters of benzene and shaken periodically. The solution was decanted after 24 hours, a fresh 200-milliliter portion of benzene added, and extraction continued for another 24 hours. This procedure was repeated for a third 24-hour period. By this procedure approxi-

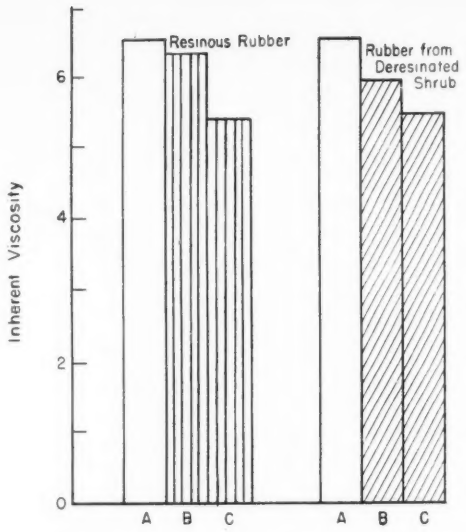


Fig. 2. Comparison of the Effects of Processing Deresinated and Resinous Guayule Rubber upon the Inherent Viscosity of the Rubber in Benzene Solution

A—Control
B—After Pebble Milling
C—After Oven Drying
Least Significant Difference at P Less Than 0.01 = 0.16
[P Denotes Probability at the 1% Level (7)]

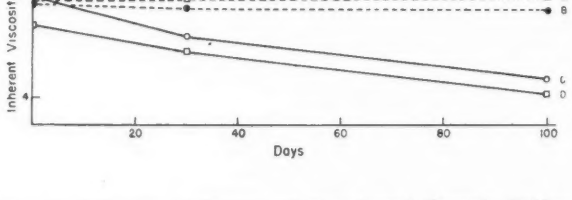


Fig. 3. Influence of Storage of Deresinated Guayule Rubber with and without Added Antioxidant upon Inherent Viscosity of Rubber in Benzene Solution

Treatment prior to Storage
A—Oven Dried, PBNA Dip
B—Oven Dried, PBNA Spray
C—Air Dried, No Antioxidant
D—Oven Dried, No Antioxidant

mately 90% of the rubber was extracted. The combined rubber solution was diluted 2:1 for determination of rubber hydrocarbon, then diluted further, as described above, to give concentrations appropriate for viscosity measurements.

All extractions with acetone, drying of crude rubber or plant tissue, and solution in benzene were conducted in the dark at room temperature to avoid the degrading effects of light and heat.

Determination of Inherent Viscosity

The data obtained in this study are based upon measurements of the viscosity of dilute solutions of rubber in benzene. Inherent viscosities (5, 6) were used as a measure of molecular weight and were calculated from the equation: $\eta_i = \frac{\ln \eta_r}{C}$

Where η_i = inherent viscosity
η_r = relative viscosity
$= \frac{\text{Seconds for passage of solution}}{\text{Seconds for passage of benzene}}$
and C = concentration of rubber in grams per 100 milliliter of solvent.

TABLE 1. EFFECT OF OVEN DRYING UPON INHERENT VISCOSITIES OF RESINOUS AND DERESINATED GUAYULE RUBBERS

Sample	Number of Observations	Mean Initial Inherent Viscosity	Standard Deviation	Degradation Resulting from Oven Drying: Without Antioxidant	Standard Deviation	With Antioxidant
Resinous Crude Rubber				%		%
From 2-yr.-old shrub	4	7.14	0.05	23.5	4.6	....
6-yr.-old shrub	4	6.16	0.15	22.9	3.1	....
	1	6.28	....	15.6	....	7.8
	4	6.30	0.05	15.1	1.4	....
	1	6.02	....	27.2	....	13.6
Rubber from deresinated shrub						
From 6-yr.-old shrub	4	5.92	0.12	8.1	1.9	....
8-yr.-old shrub	1	5.87	....	8.7	....	2.4

Viscosity measurements were made at 25° C. ± 0.05°, using an Ostwald-Cannon-Fenske viscosimeter. The same viscosimeter was used throughout, and its calibration checked frequently, especially with new lots of benzene.

Experimental Results

Effects of Successive Processing Steps

The results of inherent viscosity determinations of rubber hydrocarbon extracted from plant material and from crude rubber samples taken at different steps in the pebble milling process are shown graphically in Figure 1.

The operation of crushing and hammermilling apparently caused no statistically significant change in inherent viscosity. However the graph shows a subsequent gradual downward trend through pebble milling and decorking and scrub milling, with respective decreases of 2.5 and 5.6% in inherent viscosities based on the control value. Oven drying caused a highly significant drop of 20.2%. Addition of PBNA before oven drying reduced the degrading effect of drying, but did not provide complete protection.

Effect of Processing on Deresinated Rubber as Compared with Resinous Rubber

The inherent viscosity of resinous rubber as affected by pebble milling and oven drying was compared with corresponding effects upon deresinated rubber obtained by acetone extraction of the shrub before pebble milling. The results are shown in Figure 2.

The data indicate that the final products, dried without benefit of antioxidant, suffered essentially the same degree of overall molecular weight reduction with inherent viscosities about 16 to 18% lower than the control value. A significant difference was noted, however, in the effect of pebble milling (in this case combined pebble milling, decorking, and scrub milling steps). The rubber from deresinated shrub shows a distinctly greater lowering of molecular weight at this stage. A compensating difference was noted on drying where the greatest deleterious effect is on the resinous rubber.

The differential effects of drying on resinous and deresinated rubbers are not difficult to explain on the basis of the catalytic effects of the resin on oxidative degradation. Further observations on the effects of drying are given in the following section of this paper. No explanation can be offered at this time for the greater deleterious effect of pebble milling on deresinated rubber, except that possibly certain natural antioxidants are removed from the shrub by acetone extraction. Consequently the rubber contained in deresinated shrub may be subject to greater degradation during pebble milling than rubber from unextracted shrub. It was not practicable in these experiments to obtain representative samples of the shrub after acetone extraction immediately before pebble milling; therefore possible deleterious effects of acetone extraction itself or of accompanying treatments cannot be definitely excluded. Nevertheless evidence obtained from other experiments has shown that cold acetone extraction of either shrub or crude resinous rubber causes no measurable lowering of molecular weight of the rubber hydrocarbon. On the other hand, the differential effect of pebble milling (including decorking and scrub milling) on resinous *vs.* deresinated rubber has been noted repeatedly.

Effect of Drying with Heat

As already pointed out, the drying step causes by far the most severe degradation or lowering of molecular weight. Further experiments were conducted to determine the relative effects of oven drying (using the through-circulation drier) upon resinous and deresinated rubbers with and without added antioxidant. As shown by the results in Table 1, resinous crude rubber is degraded to the extent of 15 to 27% based on the value for inherent viscosity before drying. The corresponding figure for deresinated rubber is only 8%. Deleterious effects of drying are markedly reduced by the addition of antioxidant PBNA, but the characteristic difference in the relative degree of degradation between the two rubbers remains evident. This difference is attributed largely to the effects of resin which probably acts as catalyst of oxidation when resinous rubber is heated.

Shrubs of different ages were used in this experiment, as noted in Table 1. Apparently no differences in molecular weight, as influenced by drying, can be ascribed to differences in shrub age. However, the relatively high initial inherent viscosity of the rubber hydrocarbon obtained from two-year-old shrub is worthy of note.

Effect of Storage on Crude Rubber

The storage of crude guayule rubber constitutes a serious problem because of the degradation that ordinarily takes place. The effects of storage in the dark at room temperature on the molecular weights of guayule rubber are shown in Figure 3. Rubber obtained from deresinated shrub was used in all cases. Three of the samples were oven dried, one without antioxidant, one with a PBNA dip, and the other with a PBNA spray before the storage period was begun. A fourth sample was treated with acetone to remove the water from the wet rubber and allowed to air dry to avoid the effect of high temperature in oven drying.

It will be noted that the antioxidant maintained the inherent viscosities at essentially their initial values. A considerable drop in molecular weight occured in both samples where no antioxidant was used. The final values for inherent viscosity appear to depend upon the initial levels, as indicated by the nearly parallel curves in Figures 3.

Summary and Conclusions

The work reported in this paper points out those steps in the pebble milling process in the present stage of development in this laboratory which influence molecular weight adversely. Drying the crude rubber with heat is indicated as being very deleterious. The relatively small changes in inherent viscosity that occur in other processing steps are not without significance, and their cumulative or overall effects may contribute appreciably to lowered quality of the final products.

The quantitative significance of changes in inherent viscosity or molecular weight in terms of the quality of

guayule rubber is not known. However the molecular weights of rubber polymers have been shown to influence their physical properties (5, 8). Experience in the physical testing of guayule rubber in this laboratory indicates that high-temperature drying without added antioxidant is definitely harmful to quality and also that marked deterioration occurs on aging. Relatively large changes in inherent viscosity are observed to be characteristic of these conditions of treatment.

It is recognized that changes in inherent viscosity may be brought about by changes in shape, structure, or solvation of the rubber hydrocarbon molecule independent of changes in molecular weight, but such effects are not considered to have played any significant role in this study. For example, gel rubber formation which is characteristic of *Hevea* rubber processing was not encountered in this investigation with guayule rubber, as shown by complete solubility of the crude in benzene under all conditions.

While interpretation of the true significance of inherent viscosity values may be limited by these and related considerations, it is believed, nevertheless, that the determination of inherent viscosity provides a means for comparing effects of different processing treatments and thereby a tool for the guidance of further process development or improvement which will yield guayule rubber of optimum quality.

Inherent viscosities of benzene-rubber solutions are used to measure the relative changes in molecular weight of guayule rubber that occur in the several steps of the pebble milling process of recovery and during subsequent storage. A progressive degradation is observed. Drying the rubber with heat is particularly injurious. Deresinated rubber is more stable toward heat than the resinous product. Application of antioxidant offers at least partial protection against the adverse effects of heat and storage.

The authors gratefully acknowledge the assistance of W. J. Gowans and R. V. Crook for determinations of rubber hydrocarbon, and of E. C. Taylor for statistical analyses of the data.

Bibliography

(1) "Rubber Recovery from Freshly Harvested Guayule." K. W. Taylor, R. L. Chubb, India RUBBER WORLD, 123, 5, 557 (1951).
(2) "Deresination as a Means of Improving the Quality of Guayle Rubber. I. Shrub Deresination." R. L. Chubb, E. C. Taylor, I. C. Feustel. Manuscript in process of publication.
(3) "Filed Plot Technique." W. H. Leonard, A. G. Clark. Burgess Publishing Co., Minneapolis, Minn. (1941).
(4) "Determination of Rubber Hydrocarbon by an Improved Bromination Method." W. J. Gowans, F. E. Clark. Manuscript in process of publication.
(5) "Effect of Molecular Weight Distribution on Physical Properties of Natural and Synthetic Polymers." B. L. Johnson, *Ind. Eng. Chem.*, 40, 351 (1948).
(6) "The Molecular Weight of Rubber in Different Parts of the Guayule Plant." H. M. Benedict, P. M. Brooks, R. F. Puckett, *Plant Physiol.*, 25 120 (1950).
(7) "Statistical Methods." George W. Snedecor. Iowa State College Press, Ames, Iowa. (1940).
(8) "Variability of Elastomers. A Study of the Relationship between Molecular Weight and Physical Properties of Polymers." W. S. Penn, *India Rubber J.*, 119, 132 (1950).

Tensile Tester Accessories

SEVERAL new compression accessories have been added to extend greatly the versatility of the Instron tensile tester made by Instron Engineering Corp., Quincy 71, Mass. An auxiliary and easily removable cross-head is attached to the frame below the regular moving cross-head. The sample is compressed between the moving cross-head and a rigidly attached load sensitive table with compression - type load cells.

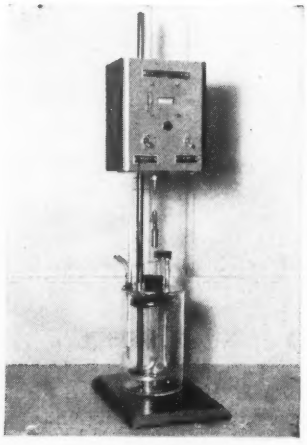
Instron Tensile Tester with New Compression Accessories

The same flexibility of control for operating the motion of the machine's cross - head in tensile measurements is now possible for compression testing. Load deformation, cyclic, and relaxation data can be obtained with accuracy and high-speed response. By the use of simple jigs and fixtures, torsion and flexural measurements can also be carried out to evaluate more completely the mechanical properties of the test specimen. Three interchangeable load cells provide a compression test range which extends from a minimum of 20 grams up to 5000 pounds.

An integrator has also been developed which provides immediate counter readings of the area under the load deformation curve equivalent to the energy either absorbed or returned by the test sample. This integrator is expected to find wide application not only in conjunction with other tensile and compression testers, but also as accessory equipment to other testing instruments.

New Gel-Time Meter

A NEW gel-time meter, designed to measure the time required for fluid thermosetting compositions to reach the point of rapid viscosity change during polymerization, has been announced by the special products division of General Electric Co., Schenectady 5, N. Y. The instrument is claimed to be of aid in the evaluation of thermosetting compositions used in the manufacture of monomers, resins, varnishes, and protective coatings and can also be used for studying the effects of such variables as reaction temperatures, catalysts, inhibiters, and quality of the main reactants.



New G-E Gel-Time Meter

The meter measures the gel time, a direct function of viscosity drag in the test sample, by means of a rotating spindle suspended from a torsional spring. As the viscosity of the test fluid increases, it creates an additional drag on the spindle. At the gel point the viscosity increases very suddenly, and the increased drag on the spindle closes a switch which stops the timing mechanism and actuates the electrical indicator.

Another important feature is the control unit which contains an alarm system designed to give both audible and visual indications when the fluid reaches its point of incipient gelation. The control unit also contains the timing circuit and both power and test switches. A small Calrod heating unit and a condensing coil are used to keep the boiling bath at a known constant temperature. Mounted on a ring stand with a seven- by 10-inch base, the meter has an overall height of approximately 20 inches and weighs 20 pounds. It operates on 115-volt, 60-cycle, 350-watt electric power.

Editorials

Need of Butyl Expansion May Encourage Desirable Rubber Program Changes

BUTYL-rubber, generally considered to be superior to natural rubber for inner tubes and some other special uses, is not available in sufficient amounts to meet current and future demand. Expansion of existing government-owned production facilities has been recommended for some time and again most recently by Defense Mobilizer Charles E. Wilson in his Third Quarterly Report to the President on October 1.

Legislation to provide for butyl expansion was drafted by the National Security Resources Board for action by the last session of Congress, but apparently was never submitted because government rubber planners realized that construction of new government synthetic rubber plants at this time would not be in accord with national rubber policy, as enunciated by Congress, itself, and by the President. The keystone of this policy is that the government should divest itself of ownership of synthetic rubber facilities at the earliest practical moment, and that the advent of a healthy, competitive, privately owned and managed synthetic rubber industry should be delayed no longer than necessary.

There is general agreement, both in industry and government, that private ownership of butyl rubber plants does not face the hazards of severe competition from possible low priced natural rubber that GR-S still does. Butyl rubber is a preferred material for automotive inner tubes, which now account for almost all butyl consumption, some 75,000 tons a year.

Government rubber officials would like very much to see private industry undertake the construction of the necessary additional butyl capacity. Interested firms are reluctant, however, to invest the necessary funds and to try to produce and sell butyl rubber in competition with government sales of this rubber at a price virtually equal to production costs, even though adequate priorities for steel and other materials as well as the customary certificate of necessity and tax amortization privilege accorded new defense facilities would be readily available.

An obvious solution to this difficulty would be for the government to sell the existing plants to private industry and remove itself entirely, except for a national security minimum production clause, from the field of production and sale of butyl rubber. Such action would seem to offer the necessary inducement to private industry to enter the field and build another plant and, at the same time, would represent another logical step in achieving a "healthy, competitive, privately owned and managed synthetic rubber industry."

The first real step aimed at achieving a privately owned synthetic rubber industry in this country, following the end of the late war, was the sale of the government owned neoprene plant to the du Pont company on January 1, 1949. Consumption of neoprene has increased steadily since that time, and the expected new and improved types of neoprene have also been developed. The du Pont company recently increased the capacity of the plant, and larger amounts of neoprene will be available in the near future.

A similar rise in the production and consumption of butyl rubber and the more rapid development of new and improved types would surely follow if the butyl plants were privately owned and operated, particularly if two or more firms were to operate separate plants in competition with each other.

In the field of GR-S synthetic rubber there are also possibilities for early private ownership of at least some of these government facilities. Cold GR-S latex has been developed to the point where it is about equal to natural rubber latex for many foam sponge products and at a much lower cost. When planned expansions of government GR-S cold latex production are completed, they should provide an attractive proposition for private industry, if the government would remove itself completely from the field.

Then there is the field of high Mooney viscosity GR-S oil masterbatch-type rubber which might be another place where private industry would be interested in producing and selling synthetic rubber, if, again, the government would sell the necessary plants and discontinue producing and marketing this type of rubber.

The Rubber Act of 1950 requires that the President make recommendations to Congress on January 15, 1952, for disposal of government owned synthetic rubber facilities. An interagency committee was scheduled to hold its first meeting on this subject in Washington in late October.

Problems surrounding the formation of synthetic rubber plant disposal policy are many and complex. Basically, however, the first practical requirement for such disposal is that a given-type synthetic rubber be able to compete with natural rubber in a free market.

Butyl rubber has been ready for such competition for some time, and cold GR-S latex and high Mooney viscosity GR-S oil masterbatch-type rubber may soon be in the same category. Precedent has been established for the gradual rather than complete transfer of the synthetic rubber industry to private hands, and the Rubber Act of 1952 should recognize that butyl rubber has reached maturity, and other special GR-S types are well on their way. Butyl rubber should be turned over to private industry as early in 1952 as possible.

R. G. Seaman

Scientific and Technical Activities

Panel Discussion on Rubber to Metal Bonding

A TRANSCRIPT of the panel discussion on rubber to metal bonding, which featured the April 10 meeting of the Los Angeles Rubber Group, Inc., is now available. Joseph B. Larkin, Patterson-Ballagh Division, Byron Jackson Co., acted as chairman and moderator of the discussion, and the panel members were Fred T. Shor, McClatchie Mfg. Co.; John Akers, Goodyear Tire & Rubber Co.; Bert Reynolds, Stoner Rubber Co.; and F. J. French, Kirkhill Rubber Co.

The discussion consisted of individual talks on aspects of rubber to metal bonding by the four panel members, followed by a question and answer period. The talks given follow: "Metal Preparation," Mr. Shor; "Compounding," Mr. Akers; "Cements," Mr. Reynolds; and "Molding and Testing," Mr. French. The talks and the question and answer period that followed are given below, supplementing the meeting report published in our June issue, page 336.

Metal Preparation

The brass plating of metallic inserts is one of the most important methods of bonding rubber to metal. It consists of depositing a thin layer, often only 0.00001-inch thick, of a copper-zinc alloy on the surface of the metal being treated. Even when all precautions are taken, bond failures do occur occasionally, but this condition is equally true of other methods of bonding rubber to metal.

The metals to which an elastomer can be bonded by means of brass plating includes cast and malleable iron, low and high carbon steels (although low carbon steel is far superior), zinc, copper, aluminum and its alloys, cadmium, nickel, stainless steel, and others. It should be emphasized that metal parts to be brass plated for bonding must be non-porous; otherwise the cleaning and plating solutions will be retained in the metal pores and bleed out during vulcanization, resulting in spotty adhesion areas.

The metal parts to be bonded are degreased, pickled, or shot-blasted and then suspended from the cathode bar in a brass plating solution. Brass is deposited as an alloy from anodes of the same material. The metal part being plated acts as the cathode in a conducting solution which consists of a mixture of copper and zinc cyanides along with other chemicals to give high conductivity and greater stability. Solution composition, temperature, amperage, voltage, current density, pH, time of plating, and agitation are all carefully controlled. After plating, the parts are washed in water, dried, and finally cemented prior to vulcanization.

The principal advantages of brass plating are: (1) formation of an age resisting bond; (2) formation of a heat resisting bond; (3) formation of an oil and solvent resisting bond; and (4) providing a surface treatment that will not wipe off under the flow of the rubber compound during vulcanization.

The theory of adhesion of rubber to a brass plating is one of a chemical linkage between the reactants, copper, zinc, sulfur, and rubber. Brass is discolored when a satisfactory rubber adhesion is observed, indicating that a chemical reaction has taken place between the rubber and brass plating.

The fundamental factors governing the bond are: (1) activity of the rubber; (2) activity of the brass; and (3) vulcanization process.

In general, softeners and antioxidants do not appear materially to affect the bond obtained. Reinforcing fillers rapidly raise the adhesion strength of the bond to as much as 1,000 psi. from that of a pure gum compound which has an adhesion strength of 200 psi. Sulfur is apparently necessary for a satisfactory bond, with bond strength rising slightly from an 0.5% sulfur content level, but no further improvement in bond strength is obtained by increasing the sulfur content from 5-10%.

The rubber ingredient which seems to have the most pronounced effect on the bond is the accelerator. A slow rate of set-up is essential for satisfactory bonding, since an increase in vulcanization activity is accompanied by a decrease in activity of the bonding reaction.

The second fundamental factor, activity of the brass, is most important and involves composition of the brass, crystal structure, and presence of codeposited substances with the brass plate. Brass specified for adhesion usually contain 70% copper and 30% zinc, but rubber can be bonded to brasses ranging from 60-80% in copper content. Generally speaking, adhesion decreases as the copper content rises. Crystal structure is apparent when a new plating bath is being started, but variations are less pronounced with established baths in regular work. Codeposition of foreign substances with the brass plate often interferes with the bond obtained.

The third factor, vulcanization process, takes into account the molding conditions such as pressure, rubber movement, amount of heating, and rate of heating. Pressure and rubber movement are largely a mechanical problem of putting the rubber in the right place at the right time. The amount and rate of heating are more important from a chemical standpoint, with slow heating favoring the attack of the brass by the sulfur. Both under- and over-curing seem to have only slight effects on adhesion. The main drawback to the use of brass plate, despite the excellent adhesion results obtained, is the uncertainty about what constitutes quality in a plated metal and how to control the plating process so as to obtain the necessary quality at all times.

Compounding

In compounding rubber for metal adhesion we are concerned not only with obtaining a bond with some type of prepared metal surface, but also with the end-use for which the part is intended. Questions such as "How strong a bond will actually be needed to resist the forces of tension and shear which may act upon the rubber?" and "What will be the effect of heat, solvents, and chemicals upon the union of rubber and metal?" must be answered before the compounder can begin to design a stock for any given use.

Elastomers are bonded to many types of metal, and the following applications will be briefly discussed: (1) tank and pipe linings; (2) industrial roll coverings; (3) solid tire treads; and (4) miscellaneous molded goods.

The main function of tank and pipe lining compounds is to resist the attack of solutions and chemicals. Very rarely is any type of metal other than iron or steel used for either tanks or piping, and only three different elastomers are customarily employed. Because neoprene plays only a minor part in these particular applications, the following discussion will be limited to natural rubber and GR-S.

Natural rubber is compounded in both soft and semi-hard stocks. Soft rubber linings (30-60 Shore) are usually loaded with furnace blacks and are cured at normal sufur and acceleration levels. The addition of resinous or tacky softener is a distinct aid to good building adhesion. Semi-hard rubber stocks are used for the more severe types of service and are usually loaded with some inert filler such as silica or barytes. High sulfur and normal accelerator contents are combined with tacky softeners. When semi-hard rubber or GR-S linings are used, it is advantageous to use a softer rubber tie gum. As the actual metal adhesion is effected through the tie gum, some compound information on this type of stock is essential. Tie gums are usually loaded with furnace blacks and tacky softeners and contain normal acceleration. Low sulfur (insoluble sulfur may well be employed) is advisable, owing to the migration of this material from the semi-hard cover stock.

GR-S is only used as a semi-hard stock and usually in conjunction with a softer natural rubber tie gum. Glue-precipitated, low water absorption GR-S is preferable for this application. The same general compounding rules apply here as to natural rubber, but the percentage of tacky softeners is usually increased.

Gum-covered industrial rolls require an excellent bond because the shearing forces are so great. As was true of tank lining, steel is the commonly used metal. Natural rubber, neoprene, GR-S, and nitrile rubber have all been used as roll covering stocks, but at present neoprene usage surpasses that of all the others.

Neoprene compounds may be white or black, and hard or soft. The softer compounds require a certain amount of Neophax and process oil. The rate of cure is decelerated by reducing the amount of zinc oxide, and the loading pigments may be furnace black, clay, or barytes. As the Shore hardness is increased, both the Neophax and process oil contents are reduced until the former is eliminated completely. Furnace blacks may be replaced by channel blacks, the white fillers by silene EF.

Solid tire stocks also require a good metal bond. In this application two metals are in common usage: aluminum alloys for small molded-on wheels; and steel for the larger and more severe applications. Since these treads are now generally limited to GR-S, the following discussion will apply to that polymer only. Although

the stock can be bonded directly to aluminum alloys, a safer method is to use a natural rubber tie gum with a lower Shore hardness.

GR-S tread stocks can be made from either regular or cold rubber polymers, but the latter will give the better service. In lower-grade stocks some reclaim or tread peel springs may be used, and the black loading can be split between channel and furnace types. For severe applications, channel black appears superior to all others. Strip adhesion can often be doubled by cementing or solvent washing the slugs before molding. This point is especially true when the stock is applied directly to the cemented metal.

Natural rubber tie gums should be 60±5 hard and should contain a loading of both carbon black and zinc oxide. The softener content should be kept low, and the accelerator and sulfur ratios should be normal. Insoluble sulfur can well be utilized in all tie gum stocks as well as tie cements.

The last and most interesting division of compounding for metal adhesion includes all the miscellaneous items such as automotive parts, airmotive parts, valves, oil-well specialties, and many others. In this section we encounter nearly every type of metal, and because the parts are small and conveniently handled, brass plating plays a major role.

Since the products vary so greatly in usage and in physical properties, only general compounding rules can be given for natural rubber, GR-S, neoprene, nitrile, and butyl compounds.

Natural Rubber Compounds. When the compound is 70 or over in hardness, it is better to use a softer tie gum. Cementing or solvent washing the slugs will improve adhesion. Keep prepared slugs covered and free from dusting materials, dirt, or grease. Loadings of channel black and zinc oxide give the best adhesion to Ty-Ply; while reinforcing furnace blacks give better adhesion to brass plate. Sulfurless compounds as a rule do not give good adhesion, especially to brass plate. Avoid the use of non-tacky or bloom-producing softeners such as paraffin and petrolatum. Avoid excessive acceleration and accelerator bloom (the same is true for antioxidants). Avoid or wash off dusting powders such as talc and whiting (zinc stearate may be used).

GR-S Compounds. While GR-S can be bonded directly to a prepared metal surface, it is safer to use a natural rubber tie gum, especially when over 70-hard stocks are used. Follow the same general rules for cleanliness and washing slugs as for natural rubber. The same principles apply to sulfurless compounds and to acceleration, although the type of acceleration is not so critical when bonding to brass plate. Channel black appears the best loading material for GR-S. Use limited amounts of paraffins and antioxidants.

Neoprene Compounds. SRF black is the best loading material for neoprene, although MPC black, clay, and Silene EF may be used. Use resinous or ester-type softeners. Avoid the use of aliphatic solvents when cleaning stock. Apply the same general rules for cleanliness and care of material as for natural rubber. If neoprene is applied to Ty-Ply cemented steel, corrosion may take place under the bond. Either use brass plate or Parlon.

Nitrile Rubber Compounds. Nitrile rubber may be bonded to steel or aluminum alloys with equal ease. Loxite or a baked phenolic resin makes the best bonding material for aluminum, but Ty-Ply BN may also be used. FT, SRF, and HMF blacks are good loading materials. Use only a small amount of stearic acid and no petroleum-type softeners. A zinc oxide content of 5-10 parts is essential. Sulfur should be kept at a 1.5-3.0 parts level, and the accelerators in common usage are Altax, Tuads, litharge, and Vandex. Always clean slugs before molding, using a ketonic-type solvent, or use freshly tubed stock. Avoid all types of dusting materials and mold lubricants.

Butyl Compounds. There is no known method of producing good adhesion between butyl and any type of metal, but a serviceable bond may be secured between acid pickled brass and this polymer. SRF black is the best type of loading material. Use from 5-15 parts of zinc oxide. A relatively high sulfur content, 2-4 parts, aids adhesion. Captax-Tuads acceleration is satisfactory.

I realize that these general statements will not solve any specific compounding problem, but they may aid in avoiding unnecessary pitfalls. Each particular problem can only be worked out by diligently following a laboratory test program.

Cements

We have been concerned with making any rubber compound bond, and this involves many cements. In fact, we have developed about 60 cements to match our various stocks. Stocks which have been approved for specifications are bonded to various metals and tested to meet conditions previously unobtainable by using a conventional black stock.

We believe that the logical approach to bonding for the rubber chemists is to match the cement with the stock. Not all cements are commercially available; so we have developed our own cements and are having a great deal of success with them. We can bond natural rubber of 15-95 Shore, and that applies to most of the other polymers too. We have developed cements that solvent won't remove and, in some instances, had to burn both the rubber and metal to break the bond. To salvage the inserts, remove the char. On other occasions we attempt to break the bond by tumbling the covered inserts at a temperature of —108° F. Here again, the cement plays an important part. We feel it is more important to develop bonding cements than it is to match the compound to the cement.

We believe there is a great need of bonded parts in the aircraft industry, but have had to do a lot of selling in order to prove our point. Aircraft engineers have been told that low durometer stocks cannot be bonded satisfactorily. We first encountered this attitude with vibration isolators where holes are drilled in the superstructures. The engineers felt that the use of bonded parts involved many changes and said we would have to make a softer compound in the hardness range of 15-20 Shore. This problem required considerable development work, but an answer has been found and lies in cements.

There are one or two questions on bonding with 90-Shore Hycar. We suggest a phenolic-type cement which can be found in the "Hycar Blue Book." The process involves one coat of cement, heating it, applying another coat, and carefully restricting the flow.

Molding and Testing

Years ago the bonding of natural rubber to a few of the common metals such as aluminum, brass, and steel did not present too difficult a problem to the rubber engineer. The introduction of neoprene to the rubber industry did increase bonding problems. Today the bonding of all types of synthetics to the various metals and alloys has become a science in itself. Improper mold design or insert design will weaken a bonded part.

A flash mold is so-called because any excessive material allowed to escape between the land area of the mold is called "flash" or "overflow." If inserts are used in this mold, the bond must be carefully checked because the wiping action of the stock may, as it flows out of the mold, remove the bonding cement. It is also important that the insert be so positioned that it does not lie on the same plane as the parting line of the mold.

The compression-type mold consists of a cavity and plunger with suitable registering pins to hold the various pieces of the mold together. Molds of this type are very suitable for holding inserts in place. In the designing of a compression mold, the removal of the bonded part without causing an undue strain on the bonded area should always be kept in mind.

Today the transfer mold is as popular as the flash and compression type of molds. When the charge is introduced into this type of mold, it is a soft, spaghetti-shaped mass that flows around the insert without distorting it or wiping away any excess amount of bonding cement. For this reason this type of mold is used by many rubber shops in special applications.

In designing an insert to which rubber is to be bonded, one should use as large a safety factor as possible. By this statement we mean that inserts should not be easily distorted, and the bonding area should be great enough to allow the rubber to hold without rupture when the part is in use.

A high or low curing temperature does not necessarily result in a good or bad bond. A good bond is obtained when the sulfur reacts with the bonding cement and rubber simultaneously, so that the rate of cure is not so fast that the rubber sets up or so slow that the bond sets up while the rubber is still in a plastic condition. Gurney, an English rubber engineer, stated that the bond strength could be correlated to the time required for a stock to set up. The value he obtained when rubber was cured to a brass plate follows:

Adhesion, Psi.	Set-Up Time, Min.
1,000	8
900	12
700	13
600	83

Buchan in his book, "Rubber to Metal Bonding," states that a bond starts when cuprous sulfide is formed and in turn reacts with the rubber molecule at points of unsaturation. As mentioned earlier, cure is not critical in obtaining an ultimate bond unless the rubber is over- or undercured to such an extent that its tensile strength and tear resistance are impaired.

Although most bonds are thermosetting in nature, any rough handling will cause the bond to break. Parts bonded with cements have a bond strength, when hot, of less than one-half their bond strength when cold. In the case of phenol-formaldehyde cements, the bond strength, when tested hot, will be only 40-60% of the bond when cold.

A few rubber shops handle nothing but rubber bonded parts and consequently cannot depend entirely upon commercial bonding cements to take care of their problems. They are compelled to formulate many of their own bonding cements. In the majority of shops, however, standard bonding cements are used, and if these fail to produce the desired results, the rubber

formulations or cements are altered until an acceptable bond is obtained

Many synthetic rubbers are "boardy," when cold, and are most difficult to work when covering large areas of metal. Preheating the stock under infrared lamps or on controlled steam tables will result in a stock soft, pliable, and easy to handle. In an atmosphere of high humidity it is necessary to vulcanize a bonded part as soon as it is prepared because adhesion drops considerably as the humidity increases. Buchan shows that a bond strength of 900 psi. was obtained at a humidity of 23%, which at 40% humidity dropped to 800 psi. and at 55% to 300 psi. He also mentioned that Cycleweld cements should not be applied if the humidity is over 75%.

The testing of a bond without destroying the part has always confronted the rubber engineer. The safest precaution is first to test the batch of rubber for bond prior to its release to production. Some inspection departments use special jigs whereby the unit force exerted on the bonded part to cause rupture is determined, and a percentage figure of this force is then used to test the bond. Manufacturers with X-ray equipment are studying bonds through this medium, but as long as the rubber forms around the insert, no faulty adhesion can be detected. Other manufacturers are using high-voltage currents for inspection. Some manufacturers place the part under a low tension or shear stress while it is subjected to supersonic waves. How this test is performed is not known.

Buchan mentions one company that brass plates all its inserts and tests the plated surface with one part of a 1% solution of sulfur and carbon disulfide mixed with four parts of a 1% solution of stearic acid and benzol. If a color is formed which is dark yellow at first, changes to orange, then to brown, and finally to a greenish brown, the brass plate will produce a satisfactory bond.

The following chart gives the relative bond strengths obtainable with different types of rubber on the same metal, and different types of metals with the same rubber:

	Natural Rubber	GR-S	GR-I	Neoprene Type GN	Nitrile Rubber
Aluminum	Good	Good	Poor	Good	Excellent
B Iron	Good	Good	Poor	Good	Good
Brass	Good	Good	Fair	Good	Good
Bronze	Fair	Poor	Poor	Fair	Good
Cadmium	Good	Good	Poor	Good	Good
Copper	Good	Fair	Poor	Good	Good
G Iron	Good	Good	Poor	Good	Good
Lead	Poor	Poor	Poor	Fair	Poor
Steel	Good	Good	Poor	Good	Excellent
Tin	Poor	Poor	Poor	Fair	Good
Zinc	Fair	Poor	Poor	Fair	Good

Since many bonded parts operate at excessively high or low temperatures, the following table prepared by Buchan is most interesting:

Temperature, °C.	Bond Strength Psi.
+150	590
+100	680
+50	750
+21	813
0	915
—20	1091
—30	1116
—40	1243
—50	1817
—55	2506
—60	2770

To the rubber engineer who is confronted with adhesion problems from time to time, it is recommended that Buchan's book be obtained and studied. Vanderbilt's 1948 handbook and the "Hycar Blue Book" are also recommended.

Questions and Answers

Q. What are the effects of oil, high temperatures, low temperatures and vibration on a bond?

A. Mr. Reynolds. Oil will not affect a good bond provided the rubber compound itself is moderately oil resistant. The compound should reach maximum swell without showing any deleterious effect on the bond. Oil, regardless of its aniline point, should never cause separation between metal and rubber, however severe its action might be on the rubber itself.

Low temperature should not affect a good bond. We test our bonds in a tumbler at —108° F. High temperature, even to a point where carbonization takes place and the compound becomes brittle, should not loosen the bond.

The effect of vibration on a bond can be interpreted in two ways. Firstly, the part itself is subjected to vibrations induced while the part is working for a different purpose. A good example would be a soft valve where vibrations have been set up by changes in line pressures or fluttering. Secondly, the part is used as a vibration isolator to damp vibration between the excitor and some shock-free instrument, as is common in mounting most aircraft instruments.

Q. What is the effect of aging on bonds?

A. Mr. Akers. I think that has been pretty well answered by some of the data Mr. French has presented. In general, bonds improve on aging. This statement is true only under the condition that the metal under the bond isn't deteriorating. Stated differently, if the metal under the bond starts to rust or otherwise become corroded, the bond naturally will fail. This condition has actually been recorded in some cases where neoprene was put directly on iron and steel. If one brass plates first and then covers the part with neoprene, or uses a Parlon-type cement on the metal, rusting should be reduced to a minimum. Where a part is defective, it can often be stripped off fairly easily when the bond it quite fresh. After a part has been in use for a long period of time, it is very difficult to get it off; many times one can hardly burn it off. This condition is particularly true with tank linings. A resh tank lining can be pulled off with fair ease, but is very difficult to remove after it has had considerable aging.

Q. What is the comparison of the strength of a molded bond with a wrapped, overcured bond?

A. Mr. French. If the correct procedures are used for bonding metal to rubber either in a mold or in a vulcanizer, the bonds will be comparable. For example, comparative strip tests on a molded part and a part placed in open steam without any wrap will show bond strengths in the neighborhood of 69-70 psi. on a one-inch sample. The spiral wrapping does not necessarily give a better bond, but will prevent any porosity in the stock and reduce blisters to a minimum. In the curing of large covered inserts it is advisable first to heat up the vulcanizer. A longer cure at a lower temperature is better than a high temperature cure, but the cure must be adjusted to the thickness of the covering. It is very important that when the end of cure is reached, the vulcanizer be slowly blown down, and compressed air be introduced to maintain the same pressure as during cure. This pressure should be held until the part is at a temperature of approximately 160° F. If it is possible to place water sprays into the vulcanizer so that the water can hit the insert itself, it will help considerably in lowering the temperature of the insert and prevent any blow.

Q. What is the simplest method of securing adhesion of natural rubber to steel without plating in a small plant operation?

A. Mr. Shor. I don't think there is any simple method. The easiest methods are to use ebonite and cement, or to sandblast the part to be covered and use a chlorinated rubber cement.

Q. Is one coat of chlorinated rubber sufficient, or is it desirable to have a cover cement over it?

A. Mr. Shor. It depends on the nature of your stock. If it is tacky enough, there is no need of a cover cement. However, bond strength is increased by using the cement over the chlorinated rubber.

Q. What are the relative strengths of bonds in shear, tension, and compression?

A. Mr. Reynolds. Where the load factor remains constant, tension rates highest, shear second, and compression lowest in severity of action on the separation of metal from the rubber. We have taken advantage of this fact in several designs and have found that certain compounds can be used where previously considered unsatisfactory.

Q. What suggestions have you an bonding neoprene or Hycar compounds to steel or aluminum for —65° F. service?

A. Mr. Reynolds. Neoprene and Hycar compounds that will withstand —65° F. can be bonded to steel or aluminum with commercial cements. I am not aware of a Hycar compound that will perform at this temperature for very many applications.

Q. What effect would some of the low-temperature plasticizers have?

A. Mr. Reynolds. The only one I have had experience with is phosphate.

Q. What would you say about other plasticizers?

A. Mr. Reynolds. They would have no effect.

Q. Will butyl bond to steel, brass, or aluminum?

A. Mr. French. Butyl will bond to brass provided the brass plating contains 70% copper and 30% zinc. Recently R. W. Kaercher, of the Case Institute of Technology, presented a talk to the American Can Co. on bonding butyl rubber to brass. He gave many worth-while suggestions on this one subject, which are worth investigating. Mr. Buchan also covers the making of cements for bonding butyl in his book.

Q. What are the allowable time limits between the operations of sandblasting, degreasing, cementing, and molding?

A. Mr. Akers. It sounds like you are degreasing after sandblasting. Generally, I prefer degreasing before sandblasting if the sand is clean. In the case of aluminum and stainless steel particularly, a coat of adhesive cement, whatever it may be, must be put on almost immediately after sandblasting. Aluminum and stainless steel do not corrode, but a protective oxide coating forms on the treated metal very rapidly. This coating is deleterious to a good bond; so Ty-Ply, a phenolic resin, or whatever cement you are going to use should be placed on the metal surface directly after sandblasting.

After putting on your first coat of cement, the essential thing is to let it dry thoroughly. Cements usually contain an aromatic solvent, such as toluene, which requires a drying time of 30-60 minutes. After this, a cover cement can be used if

necessary. Once the part is cemented, you do not have to worry a great deal as long as you keep the cemented surface clean. If the rest period is too long, the tie cement loses its tack. Of course, you can always put on another layer of tie cement if you want to freshen it prior to molding. If the Ty-Ply stands much over an hour, it begins to get a glaze effect. Whether this is an oxidation process or inherent in the nature of the cement, the bond is not so strong as it would be if it were treated with a tie cement. If you are wrapping a tie gum around a molding, you have protected all your cementing areas and can stack them for 24 hours or longer. You might have to freshen your tie gum prior to molding, but your worries are more or less over if you are using a tie gum. Get it on immediately; then your storage problem isn't too important.

Q. What is the relative increase in total bond strength obtained over a smooth surface by diamond or straight line knurling?

A. Mr. Shor. I think that question should be worded the other way around. A polished smooth surface definitely gives a better chemical bond than a machined or knurled surface.

Q. How would you compare a polished surface with a sandblasted surface?

A. Mr. Shor. If the sandblasting is done with a very fine grit, you will find better adhesion than with a coarse grit. In other words, a polished surface again is indicated.

Q. Will you outline a procedure for bonding latex to metal?

A. Mr. French. The bonding of latex to metal is no different from the bonding of natural or synthetic rubbers to metal. Latex used for bonding contains 45% solids. The part to be bonded should be sandblasted and then covered with Vulcalock cement prior to the latex dip. The part is cured in either open steam or in hot air, although the air bond is not so good. Latex shrinks 40-50%, a fact which must be considered, especially on articles which have concave sides or rounded corners. As an illustration, no trouble is experienced in bonding latex to the outside of a test tube, but considerable trouble would be experienced in bonding the inside, owing to the pulling away of the latex film from the corners.

Q. What type of cement and method of application is most satisfactory for bonding a nitrile rubber-polyvinyl chloride compound to steel?

A. Mr. Reynolds. Ty-Ply BX or phenolic cements should be satisfactory for bonding nitrile rubber-polyvinyl chloride compounds to steel. A low polyvinyl chloride content compound should produce a better bond at high temperatures inasmuch as it is thermoplastic. It has been proved that the lower the PVC content the better the bond.

Q. Is there a satisfactory method of repairing rubber to metal bond failures in fully cured parts?

Mr. Akers. It depends upon the surface. If the article is very critical and the defective area very large, it is better to remove the entire covering and start all over again. If the area is small, it can be repaired. Cut out the defective material; buff the metal with either a grinding stone or sanding wheel; then repaint with a bonding cement. Work a faster curing repair stock into the recess, using care that not too much stock is placed in the defective area.

Q. How effective are infrared lamps for rapid drying of cements on inserts?

A. Mr. French. Infrared lamps will dry cement very rapidly. It should not be left to the human element to turn off the lamps. The light should be connected to a timer to guard against the formation of a surface film. If an uncured film does form, there is a possibility that it may prevent the solvent from evaporating and cause blisters to form at the bonding junction. The safest precaution is to let the cements air dry slowly in a room free from dust.

Q. Is it possible to secure the same degree of adhesion between anodized aluminum and nitrile rubber as is obtained when aluminum is sandblasted?

A. Mr. Shor. I believe the answer would be "yes" if the anodization is carefully done. If proper precautions are taken, particularly with respect to low humidity, you can get a better bond with an anodized surface on aluminum than with sandblasting.

A. Mr. French. I might add that if you sandblast and then anodize, the bond sometimes is better than either single operation alone.

Q. What cements are best for bonding neoprene to steel?

A. Mr. Reynolds. Ty-Ply S cement has proved adequate for bonding neoprene to steel when the hardness ranges between 55-75 Shore durometer.

Q. What do you do when you get below the 55 Shore range that you mentioned?

A. Mr. Reynolds. We would go into our own cements there, especially when the part is subjected to vibration.

Q. Will a black loaded GR-S hose stock show copper deterioration if it is cured in contact with a bronze-coated steel wire?

A. Mr. French. It is doubtful if the copper in the bronze would cause a GR-S stock to deteriorate owing to the fact that the Cumate accelerator used in GR-S compounds has no poisoning effect on these stocks.

Q. What are the best procedure and the best bonding agent for adhering a cold GR-S compound similar to camelback with a hardness of 60 to an aluminum die casting?

A. Mr. Reynolds. I would recommend Ty-Ply Q cement for bonding a 60 Shore GR-S cold rubber tread stock to an aluminum casting. Most castings are not preheated sufficiently to remove all the oil; consequently, if one bonds a stock to them without treatment, the adhesion is not satisfactory. A mixture of xylene and benzene has proved one of the best solvents for removing oil from aluminum castings when Ty-Ply Q cement has been used as the bonding medium.

Q. What procedure would you use for bonding GR-S, natural rubber, or neoprene stocks to chrome-plated rolls?

A. Mr. Shor. The chrome-plated roll should be sandblasted and Ty-Plyed with the correct type. As a rule, you will not experience any difficulty in securing a fairly good bond.

Q. It is possible to bond all types of rubbers including those plasticized heavily?

A. Mr. Akers. Eliminating butyl which is very difficult to bond, most all other types of rubbers in any degree of Shore hardness can be bonded. The problem will have to be very specific. How good a bond do you want? In some cases a strip adhesion of 8-20 psi. is considered sufficient. In other cases a bond of 50 psi. is required; while for extreme cases a strip adhesion of 100 psi. is required. One of the easiest ways of checking your adhesion is to pull the rubber off in a one-inch wide strip from the metal surface. You can do this pulling off by hanging weights on the strip or by using a Scott machine. A good average pull figure is around 50 pounds. If you get near the 100-pound mark, you have a very excellent bond. If you want to convert this figure over to psi., you can use a factor between 8 and 10.

Q. What is the best method of bonding nitrile rubbers to metal, and what precautions should be taken?

A. Mr. Reynolds. Cleaning and handling and timing are the factors that have been used up to this time. We like to use timing in a different way, and recommend a phenolic cement. You have to be very careful on timing from the time the metal is sandblasted and the first coat of cement is painted on. We recommend two coats of cement. The part should be heated and cured at 320°F., but should be allowed to set 30 minutes before molding so that flow is reduced to a minimum.

Q. What is the best method of bonding natural or synthetic rubber to cast or sheet magnesium?

A. Mr. Reynolds. Use Ty-Ply S after sandblasting.

Q. What are the relative advantages of a cement bond and a brass-plating method?

A. Mr. Shor. As far as Ty-Ply goes, it certainly is cheaper than brass plating and is certainly simplier. However, the ultimate bond that you could get with brass plates must always be taken into consideration. If the end-product is worth it, a brass plate should be definitely considered. A brass plate is both age and heat resisting; while with Ty-Ply such resistance is questionable. The surface treatment of brass plating will not wipe off under the flow of rubber during vulcanization, but there have been instances in Ty-Ply bonding where this has been the case. Personally, we feel that brass bonding is better than Ty-Ply.

A. Mr. Akers. We have one plant which uses a great deal of brass plating while our local plant uses various types of cements. If carefully handled, I believe you can get an equal bond with either type. The only thing I want to point out is that with neoprene on Ty-Ply you may have trouble with corrosion underneath which weakens the bond.

Sterling-V, New Black

A NEW oil furnace carbon black, Sterling-V, has been announced by Godfrey L. Cabot, Inc., 77 Franklin St., Boston 10, Mass. Called "V" for versatile, the new product is designated by Cabot as a GPF, or general-purpose furnace black, that is unequalled for versatility of application. The product is said to offer in a single grade the combined properties of HMF modulus, SRF resilience, and typical oil black smooth extrusion.

Now in commercial production, Sterling-V is available in carload quantities at prices in the SRF-HMF black range. Its superior resilience properties coupled with high modulus should prove particularly valuable in tire carcass, sidewall, and tread base stocks. Its processing performance is said to be outstanding in the manufacture of mechanicals, wire insulation, footwear, and extruded rubber goods. A four-page bulletin is available from the company giving further information on the new black, including graphs of properties obtained in GR-S in comparison with SRF and HMF blacks.

Bloomfield Club Speaker

MORE than 100 persons, including members of the Thiokol Technical Club, were present at the Thiokol Corp. plant in Trenton, N. J., September 20, to hear G. F. Bloomfield, of the British Rubber Producers Research Association, England, discuss "The Nature of Rubber in Freshly Tapped *Hevea* Latex." Dr. Bloomfield was introduced by E. W. Fettes, manager of research and development for Thiokol Corp.

Very pleasant weather permitted those attending the meeting to enjoy a pleasant social hour and dinner on the lawn before hearing Dr. Bloomfield's talk.

It was pointed out that important objectives in recent research work at the Rubber Research Institute of Malaya have been to ascertain the molecular weight and molecular weight distribution of rubber, first in fresh *Hevea* latex, as it leaves the tree, and, successively, through the various processes of conversion into sheet rubber, with particular emphasis on factors giving rise to variability of *Hevea* rubber.

Techniques recently developed in Malaya enable latex to be collected under asceptic conditions without access to light or air and also enable solutions of the rubber component of latex to be obtained and characterized within a few minutes after the rubber leaves the tree. It has thus been demonstrated that fresh *Hevea* latex contains rubber hydrocarbon of high average molecular weight, as indicated by intrinsic viscosity in the range of 5 to 8 when measured in dilute solution in benzene. Very little variation is found in average intrinsic viscosity of the rubber from a given tree during a period of more than a year, covering periods of defoliation and of considerable climatic change.

Fractionation of rubber solutions obtained at the tree reveals a broad molecular weight distribution between intrinsic viscosities 0.5 to over 12, with the major part of the hydrocarbon in the upper molecular weight ranges with intrinsic viscosity above 6. Osmotic pressure of some narrow fractions in the range 3 to 7 shows that the relation between intrinsic viscosity and molecular weight is given by

$$[\eta] = 5 \times 10^{-4} M_{\cdot}^{0.67}$$

hence the molecular weight range of *Hevea* rubber is from several millions down to below 100,000. Low-molecular fractions with molecular weight below 100,000 are present in relatively small proportions (generally 5% or less). These are soft, tacky substances which contain small portions of combined oxygen; it is not yet known whether they are degradation products formed within the tree, or whether they are low molecular weight products of the biosynthesis of rubber, in which the combined oxygen may arise from the mode of building up these long-chain polyisoprenic molecules. It is, however, certain that they are not formed by oxidative degradation *after* the rubber has left the tree. Higher molecular weight fractions cannot, of course, be assumed to be necessarily free from combined oxygen as the oxygen content would soon fall below the limit detectable by direct analysis as the molecular weight increases.

Also of interest is a slow change which occurs in latex within the tree when tapping is discontinued, Dr. Bloomfield added. The rubber hydrocarbon within the latex particles becomes cross-linked, forming microgel, and in long rested or previously untapped trees most of the rubber hydrocarbon is present in this form and so yields solution of low intrinsic viscosity and enormous molecular weight, as revealed osmotically. The presence of gel in rubber greatly increases its hardness as measured by either Mooney viscosity or Williams plasticity; consequently these newly discovered microgel latices yield extremely hard rubbers. When a tree is brought into regular tapping, the microgel latex first obtained at the tapping cut very soon is replaced by normal latex, and this change can be easily followed by observing the rise in intrinsic viscosity and the fall in Mooney and Williams plasticities. Latex samples taken a few feet away from the tapping cut, however, continue to show microgel characteristics for a longer period, and even in trees which have been in regular tapping for 20 years, microgel latex can still be found in locations 20 to 30 feet above the tapping cut. It follows, therefore, that rubber in the latex obtained at the tapping cut has been synthesized more or less locally and has not been transported to the tapping cut from every part of the tree. The microgel latex in fact enables the area of a tree affected by tapping to be defined, Dr. Bloomfield said in conclusion.

Additional Experimental GR-S Polymers and Latices

THE table below gives the additions and changes in the list of experimental GR-S polymers and latices authorized by the Office of Rubber Reserve, RFC, during the period from August 28 to September 26, 1951.

Normally, experimental polymers will be produced only at the request of the consumers, and 20 bales (one bale weighs approximately 75 pounds) of the original run will be set aside, if possible, for distribution to other interested companies for their evaluation. The 20 bales, when available, will be distributed in quantities of one bale or two bales upon request to the Sales Division of Rubber Reserve, or will be held for six months after the experimental polymer was produced, unless otherwise consigned before that time. Subsequent production runs will be made if sufficient requests are received.

These new polymers are experimental only, and ORR does not make any representations or warranties of any kind, expressed or implied, as to the specifications or properties of such experimental polymers or the results to be obtained from their use.

X-Number Designation	Polymer Description
X-670 GR-S	Similar to GR-S-100, except shortstopped with sodium or potassium dimethyl dithiocarbamate alone or plus Polyamine H (or equivalent) or sulfur as sodium polysulfide.
X-671 GR-S	Butadiene/styrene charge ratio 75/25 adjusted to give 20±1% bound styrene polymerized at 122° F. Activated with cumene hydroperoxide or equivalent; emulsified with Na-ORR soap. Shortstopped with sodium or potassium dimethyl dithiocarbamate alone or plus Polyamine H (or equivalent) or sulfur as sodium polysulfide. Stabilized with 1.25% (on the rubber) B.L.E. Mooney viscosity (ML-4 at 212° F.), 54±4.
X-672 GR-S	GR-S (X-647 type) polymerized at reduced temperature to be used as standard reference lot beginning December 1, 1951.
X-673 GR-S Latex	Similar to X-635 GR-S Latex, except total solids content of the latex to be 47.0-49.9%.

Los Angeles Meetings

A TALK on "Optical Strain Analysis of Rubber Products," by Douglas Chalmers, Golden State Rubber & Latex Corp., featured the technical session of the June 5 meeting of The Los Angeles Rubber Group, Inc. Approximately 60 members and guests were present at the session, held at the Hotel Mayfair.

Mr. Chalmers noted that while photoelastic applications in analysis and design have had wide use in the study of stresses in rigid bodies, they have had only limited use in the rubber field because of the large strains encountered and the nature of the stress-strain relationships. After discussing typical problems associated with the use of photoelastic methods on rubber products, the speaker noted that materials suitable for this technique must be birefringent; that is, produce a double-refraction effect when mechanically strained and placed in a beam of polarized light. The analytical implications involved in photoelastic pictures of stressed rubber were discussed, and Mr. Chalmers described how the concentrations and contours of the photoelastic lines emanating from particular points or areas of the part being studied can be used to provide maximum reinforcement in product design.

"Los Angeles Smog and Its Effects," by Arie J. Haagen-Smit, California Institute of Technology, was the talk presented at the Groups October 2 meeting, also held at the Hotel Mayfair. Some 65 members and guests were present at the technical session and heard Dr. Haagen-Smit discuss the effect of local air pollution on rubber.

From a chemical viewpoint, one of the most interesting features of smog is its strong oxidizing power, resulting in rubber cracking. The cracking of rubber because of ozone is generally used as an accelerated aging test for rubber products. By using standardized rubber, this test can be utilized as a measure of oxidant in the air and has greatly contributed to the understanding of smog formation, Dr. Haagen-Smit said. It has been shown that this oxidant is produced by photochemical processes in the air.

Connecticut Group Outing

THE sixth annual outing of the Connecticut Rubber Group was held September 15 at Grassy Hill Park, Derby, with some 120 members and guests attending. Rain washed out the scheduled morning golf tournament, but the afternoon field events were run off. A buffet-style luncheon was served, and more than 150 valuable door prizes were distributed. Contest prize winners follow: horseshoes, M. Taylor, Seamless Rubber Co., and M. Lombardi, Sponge Rubber Products Co.; egg throw, D. Lyons, Armstrong Rubber Co., and W. O'Brien, Seamless; and softball, the New Haven-Naugatuck team captained by George Jerolman, Armstrong Rubber.

D. McKean, Whitney Blake Co., was chairman of the outing committee. He was assisted by John Tronson, R. T. Vanderbilt Co., Inc.; while Ray Dudley, Whitney Blake, acted as treasurer. Other members of the committee were Whitey Larsen, Whitney Blake; George Sprague, Sponge Rubber Products; Mr. Jerolman; Stu Boyd and Tom Skipp, both of United States Rubber Co.; and Pat Rooney, General Electric Co.

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Lockwood Speaks on Malaya

A TALK on "The Malayan End of the Korean Front," by Warren S. Lockwood, Natural Rubber Bureau, highlighted the Chicago Rubber Group's opening dinner-meeting on September 28. Held at the Morrison Hotel, Chicago, Ill., the meeting was attended by 215 members and guests.

Mr. Lockwood described the situation in the Far East as he saw it during a recent trip through Malaya. The country is in a virtual state of siege, with white men unable to venture out of their quarters at night and requiring arms during the daytime. The rubber plantations are operating under great difficulty since all buildings must be surrounded by high fences which are patrolled at night; all work in the fields must be done under armed guard; white men traveling between plantations must do so in armored vehicles; finished rubber must be transported in armored vehicles; and frequent raids are made on the plantations to slash the trees.

Discussing popular beliefs in this country, Mr. Lockwood stated that there is no natural rubber cartel, since most rubber is produced by smallholders who actively compete with each other. Also, there is no withholding of rubber for higher prices, since the plantation owners, smallholders, and rubber brokers lack the financial ability to do so. In conclusion, Mr. Lockwood declared that we should not lose the war in Malaya either through negligence or ignorance while at the same time trying to win the same war in Korea.

The meeting also included a showing of color films taken by John L. Strohm, noted author and world traveler, on his trips through Russia and the Far East. Some of the countries shown were Malaya, India, Pakistan, Indonesia, Ceylon, Indo-China, and Russia, and the films emphasized living conditions and industrial progress in these countries.

Heel and Sole Compounding

A TALK by Walter S. Edsall, Goodyear Tire & Rubber Co., entitled, "General Notes on Heel and Sole Compounding," highlighted the October 18 meeting of the Elastomers & Plastics Group, Northeastern Section, A. C. S. Some 80 members were present at the meeting, held at the Massachusetts Institute of Technology, Cambridge, Mass.

After reviewing the origin of rubber heels and soles, Mr. Edsall pointed out the growth of this industry by noting that while 10-15 different compounds were sufficient for most heel and sole manufacturers in the early 1930's, manufacturers now require some 200 or more separate compounds. The need of so many compounds arises from the fact that rubber heels, soles, and toplifts vary in composition and requirements. While satisfactory heels and soles are in wide usage, a truly adequate toplift has yet to be made. Flexing data on soling obtained in the laboratory have not been found to correlate satisfactorily with actual service, and an adequate prewear flex or wear life test is still to be developed. The compounder can achieve a degree of safety by combining good flex machine life with good hand tear to obtain a satisfactory soling.

The advent of synthetic rubbers and plastics for heels and soling has also added to the problems of the compounder, Mr. Edsall noted. Besides the technical difficulties encountered, the compounder must know his material costs at all times, as well as the labor and overhead costs of each processing operation. Because of the haste required to rectify any production slow-ups caused by faulty compounds, a compounder is often prone to make formula adjustments as a stop-gap, rather than take the time necessary to track down the real cause of the trouble.

The following office candidates for 1951-1952 were nominated at the business session: chairman, R. Van Patten Steiger, Alfred Hale Rubber Co.; vice chairman, Lloyd H. Perry, Union Bay State Chemical Co.; secretary-treasurer, John M. Hussey, Goodyear; custodian, W. J. Perkins, Avon Sole Co.; and executive committee member (three-year term), J. H. Faull, Jr., consultant.

Holds Annual Dinner

THE fourth annual dinner of the Washington Rubber Group held in the Terrace Room at the National Airport, Alexandria, Va., was attended by about 400 members and guests, including about 50 from the National Production Authority Rubber Division. The program consisted of the induction of new officers and, except for an address by Brig. Gen. Wm. M. Creasy, Chief, Chemical Corps, Research & Engineer Division, Army Chemical Center, Maryland, on "Potentials of Biological Warfare," was primarily social in nature.

John T. Cox, Jr., consulting chemical engineer, acted as toastmaster at the dinner, introducing General Creasy.

Warren Stubblebine, Army Quartermaster Corps, retiring president of the Group, reported paid-up membership of 373 as of October 23. He introduced the officers who served with him on the executive committee in the past year and the committee chairmen.

Dr. Cox introduced Seward Byam, of E. I. du Pont de Nemours & Co., Inc., vice chairman of the Division of Rubber Chemistry, A. C. S., who brought greetings from Division Chairman Waldo Semon, B. F. Goodrich Co., and also from the Boston and Detroit Rubber groups which he had visited recently.

Embossed gavels, made of hard rubber by the Gates Rubber Co., were presented to past presidents of the Washington Group, as follows: Thodore Werkenthin, Navy Bureau of Ships; Roy Devereaux, Goodrich, and Dr. Stubblebine.

Dr. Cox presided over the induction of the new president, Theodore Scanlan, Gates Rubber. Mr. Scanlan introduced the officers who will serve with him in the coming year: vice president, Norman Bekkedahl, National Bureau of Standards; secretary, Gerald Reinsmith, Army Ordnance; treasurer, Phillip Mitten, Army Engineers; and recording secretary, Ethel Levene, Navy Bureau of Ships. Harry L. Fisher, National Research Council, Rubber Division, A. C. S., director from the Washington area, was also introduced. Committee members for the coming year are: membership, Mr. Werkenthin; program, Richard A. Harmon, Connecticut Hard Rubber Co.; and publicity, Mrs. Rachel Fanning, NBS.

Mr. Scanlan announced that Sidney Barson, Navy Bureau of Ships, will edit the Group's monthly publication, "Capital Cues."

Dr. Stubblebine expressed the Group's appreciation for their work in preparing for the annual dinner to Douglas Bonn, United States Rubber Co.; Earle Smith, Dow-Corning; and Mr. Mitten.

General Creasy first pointed out that biological warfare is a form of warfare which nature has waged against man for thousands of years, and against which our modern health practices have produced effective defenses. The new approach in warfare was novel methods of achieving deliberate dissemination of pathogenic microorganisms.

He further declared that the great possibilities of biological warfare are frightening only if we give way to panic, or if we fail to insure that we are ahead of any other nation in knowledge and preparedness in this field. He added that we already have effective means of controlling biological warefare attacks by potential enemies in our civilian health control agencies.

Methods of waging such warfare, that is, by airborne attacks and attacks on water and food supplies, and methods of defense against such attacks were reviewed.

The speaker made it clear that the development of defenses against biological warfare is a matter of continuing study and work by many organizations.

The Washington Group in future will hold its regular technical meetings on the third Wednesday of each month at the auditorium of the Potomac Electric Power Co. Speaker at the meeting on November 21 is Edward V. Osberg, assistant manager, chemical division, General Tire & Rubber Co., who will discuss "Polygen, A New Class of Synthetic Rubber."

Crocker at Ontario

A TALK on "The Manufacture of Latex Foam Sponge Rubber," by E. Charlton Crocker, General Latex & Chemical Corp., highlighted the October 9 dinner-meeting of the Ontario Rubber Section, C.I.C. Held at Hart House, University of Toronto, Toronto, Ont., Canada, the meeting attracted an attendance of 65 members and guests.

Mr. Crocker reviewed the history of latex foam and discussed the various processing methods, including the whipping process, the peroxide process, and the continuous foaming process. The advantages of the different methods were discussed, and the talk also included a review of synthetic latex foam formulations.

Hill Discusses Gaskets

THE Detroit Rubber & Plastics Group, Inc., held a dinner-meeting October 5 at the Detroit Leland Hotel, Detroit, Mich. Approximately 175 members and guests heard Ralph M. Hill, Armstrong Cork Co., speak on "Are Gaskets Engineered?" Mr. Hill's talk on the engineering aspects of gasket applications was well received by the audience. A guest at the meeting was S. G. Byam, of E. I. du Pont de Nemours & Co., Inc., vice chairman of the Division of Rubber Chemistry, A. C. S. Mr. Byam spoke briefly on the selection and qualifications of directors from the local rubber groups.

Spencer Akron Speaker

THE fall meeting of the Akron Rubber Group held at the Mayflower Hotel, Akron, O., October 19, attracted a record attendance of about 500 members and guests. Speaker for the evening was Leland E. Spencer, director of the Rubber Division of the National Production Authority, who discussed "Washington Highlights." Following Mr. Spencer's talk, a movie of the 1950 championship football game between the Cleveland Browns and the Los Angeles Rams was enjoyed.

D. F. Behney, Harwick Standard Chemical Co., chairman of the Group, first called for a report of the auditing committee headed by Ed Nahm, Naugatuck Chemical Division, United States Rubber Co., and then announced that the nominating committee for officers of the Group for the coming year would consist of E. L. Stangor, E. I. du Pont de Nemours & Co., Inc.; C. A. Ritchie, B. F. Goodrich Co.; and Henry F. Palmer, Kentucky Synthetic Corp.

George Hackim, General Tire & Rubber Co., chairman of the membership and attendance committee, handled the drawing for the two door prizes of $15 and $10, which were won by a coincidence by Wayne Brewer and W. Robert Brewer, both of Cooper Tire & Rubber Co.

V. K. Hitch, Akron Chemical Co., was called upon to introduce Mr. Spencer; he did, with reference to the speaker's previous service as deputy director of the Rubber Division of the War Production Board during the late war and with tribute to Mr. Spencer's efficiency in such work, then and now.

In his talk Mr. Spencer first emphasized that time has been the most important factor that has contributed to the security of the Western World as its security is dependent on new rubber. He reviewed the current rubber situation and gave an accounting of his stewardship since taking over the responsibilities of the NPA Rubber Division in January.

Mr. Spencer paid tribute to the present organization of the Rubber Division and also to those men from industry who had participated earlier in the year when the heavy work of reorganization and "belt tightening" on rubber supplies had been a No. 1 responsibility.

Summing up the progress in the government's rubber program to date, Mr. Spencer said: (1) Defense orders have been and will be met—in full and on time. (2) Substantial quantities have been and are being added to our natural rubber stockpile. (3) Synthetic production has reached its demonstrated capacity, and operating inventories have been rebuilt. Further expansion of capacity is well under way. (4) Essential civilian requirements have not suffered. (5) Labor dislocations have been negligible. (6) World *production* of new rubber (natural and synthetic) increased 28% over output for the first seven months of last year. World *consumption* of natural and synthetic rubber increased only 10% during the same period, and 350,000 tons per annum of new rubber is available for stockpiling—by somebody. (7) Expansion of basic material producing facilities are well under way. Expansion of essential fabricating facilities should move past the planning stage shortly. (8) Tremendous strides made in research and development of synthetic rubber greatly reduce our dependence on natural rubber and contribute to the nation's security. (9) Essential finished goods inventories are still dangerously low, but definite progress in the direction of rebuilding these inventories is now assured.

In conclusion, the speaker said that those in charge of the government rubber program believe that the present natural rubber procurement program, the present synthetic rubber production program, and the present NPA restrictions on consumption will shortly result in the requisite additions to the nation's security, a continued healthy and vigorous civilian economy, stabilized employment, and high civilan morale, while at the same time are holding domestic and world inflationary forces in check.

These programs will continue until the nation's complete security insofar as rubber is concerned is assured.

Radcliffe, Buecken Speak

THE fall meeting of the Boston Rubber Group took place October 19 at the Somerset Hotel, Boston, Mass., with 380 members and guests attending. Following a cocktail hour and dinner, the technical session featured talks on "An Improved Neoprene-Type WRT," by R. R. Radcliffe, E. I. du Pont de Nemours & Co., Inc., and "Recent Developments in Extrusion," by Hans E. Buecken, National Rubber Machinery Co.

Mr. Radcliffe's paper, to be published in our December issue, marked the first announcement of an improved neoprene polymer that combines the best properties of Neoprene Types W and RT. Mr. Buecken's paper, describing recent N.R.M. developments in extruders and strainers for cold extrusion and simplified factory processing, will also be published in a future issue of India RUBBER WORLD.

S. G. Byam, of du Pont and vice chairman of the Division of Rubber Chemistry, A. C. S., also spoke briefly on the work of the Division and its relations with the various local rubber groups.

In the business session, a slate of office candidates for 1952 was presented by the nominating committee under the chairmanship of Harry W. Sutton, Boston Woven Hose & Rubber Co., and including R. K. Patrick, Vulplex, Inc., and J. L. Haas, Hodgman Rubber Co. The current vice chairman, John Andrews, Godfrey L. Cabot Co., automatically becomes chairman next year. The other office candidates follow: vice chairman, A. W. Bryant, Binney & Smith Co., and C. A. Meyer, Harwick Standard Chemical Co.; secretary-treasurer, W. F. Malcolm, Titanium Pigment Corp., and J. A. Williams, Haartz-Mason, Inc.; and executive committee (one-year term) E. D. Covell, Stedfast Rubber Co., and A. J. Gilligan, Armstrong Cork Co., and (two-year term) J. K. West, A. G. Spalding & Bros., Inc., and J. E. Williamson, Tyer Rubber Co.

The Group's spring ski outing will be held in February, with the date to be announced at the Christmas meeting on December 14. W. E. Edsall, Goodyear Tire & Rubber Co., is chairman of the outing committee, which includes Mr. Bryant and D. D. Wright, Hood Rubber Co.

New Rubber Antioxidant

A NEW antioxidant for both GR-S and natural rubber is being made available in commercial quantities by Dow Chemical Co., Midland, Mich. Known as Styphen I, the material is a mixture of styrenated phenols and has been tested extensively in rubber research and production laboratories. According to F. H. Riley, of Dow's technical service and development division, the new antioxidant has shown outstanding non-staining properties which should make it especially useful in the protection of such rubber products as whitewall tires, refrigerator gaskets, electrical wiring insulation, and others. The storageability of rubber and its protection against surface crusting (resinification) are also said to be improved vastly with the addition of 1.25% of Styphen I.

New Rubber Foundation

THE Los Angeles Rubber Group, Inc., and the University of Southern California jointly propose to establish the TLARGI Rubber Technology Foundation at the University. The Foundation will be administered jointly by representatives of the rubber industry and the University and is an outgrowth of the major concern of TLARGI in education of rubber technologists for the West Coast area.

As an expression of faith in the proposal, and in order immediately to activate the Foundation, the Rubber Group has contributed $5,000 from its membership treasury to the Foundation. Simultaneously the University of Southern California has scheduled the first course (rubber technology) in the overall program offered in September, 1951.

The TLARGI Rubber Technology Foundation looks with confidence to the rubber industry for cooperation and assistance in establishing this project. Gifts to the Foundation, which are fully deductible for tax purposes, will constitute an investment by the rubber industry in its own future.

Officers and committees of the Group and the University have devised an educational program to provide a complete course of study in rubber technology and a rubber library and research center of national standing.

The main points of the plan are:

(1) To develop at the University an undergraduate curriculum in rubber technology in chemical engineering which will give the undergraduate some knowledge, training, and interest in the field.

(2) To create courses at the graduate level which will permit concentrated training in rubber technology and carry credit toward advanced degrees.

(3) To make graduate courses available to college graduates already in the rubber industry, through evening courses, with credits toward an advanced degree.

(4) To create a complete rubber library on the West Coast which shall be available to industry.

(5) To establish at the University of Southern California a research center in rubber of national standing, not for commercial use, but with results of study and research available to the rubber industry.

(6) To employ a rubber scientist of national reputation and standing to direct the program at the University.

(7) To maintain liaison between the industry and the University so as to guide teaching and research along lines of the most recent industrial developments.

Full details concerning the Foundation and its aims can be secured from any official of the Los Angeles Rubber Group, whose 1951 chairman is Robert D. Abbott, 5107 Anaheim-Telegraph Rd., Los Angeles 22, Calif.

NEWS of the MONTH

Rubber Industry Situation Generally Good Except for Butyl Capacity; Latex Buying Soon to Be Terminated

The rubber industry seemed free of major difficulties during October. Defense Mobilizer Wilson in his quarterly report and industry leaders in separate statements agreed, in general, that new rubber supplies were much improved, product inventories headed toward normal, sales high, and profits at a satisfactory level.

The need of additional butyl rubber production capacity has been repeatedly confirmed, but private industry is unwilling to build plants until the government gets out of the field, and a decision of the disposal of the government plant will apparently require several months to materialize.

No GR-S export in commercial amounts is now likely until at least the first quarter of 1952.

The government has finally decided to terminate its exclusive buying of natural rubber latex, but the implementing of this decision may take two or three months. Some difficulty may be experienced in disposing of government stocks.

"Thiokol" is now under allocation by the Chemicals Division of the National Production Authority. The use of sulfur by most users has been cut back to 90% of 1950 consumption.

Rubber goods pricing activity was at a minimum although Price Stabilizer DiSalle on October 22 instructed all commodity division directors to go ahead with the preparation of specific dollars-and-cents price ceilings for manufactured goods.

The rubber industry's high production level of 1950 is likely to be duplicated in 1951, and the outlook for concontinuing high-level production is optimistic.

Both Goodyear and Firestone emphasized the need of adding miles of new highways at an early date if the present chaotic traffic condition is to be eliminated, safety improved, and national security insured.

Washington Report

By

ARTHUR J. KRAFT

More Butyl Capacity Needed

Defense Mobilizer Charles E. Wilson noted in his Third Quarterly Report to the President during October that although the shortage of most rubber goods has greatly eased as a result of the rapid expansion in synthetic rubber output, additional capacity for the production of butyl rubber is needed.

In the section on rubber in this report, Wilson said:

"Though supplies of natural rubber have not improved, the reactivation of synthetic rubber plants with a capacity so far of 760,000 tons a year—and a potential capacity of 869,000 tons when production gets running more smoothly—has greatly eased the shortage of most rubber goods. Inventories in the hands of manufacturers are being built up to normal levels, and the limitation on automobile tire inventories to a 30-day supply has been removed. The ban on spare tires as original equipment on automobiles has also been lifted. There is still a shortage of butyl rubber, however, which is the only synthetic rubber suitable as a substitute for natural rubber in tire tubes and some other special uses. It appears necessary to expand our capacity for butyl."

The Wilson report, dated October 1, was expected to be followed by a proposal to Congress to authorize the construction of an additional butyl plant. Legislation to this effect was being drafted by the Nation Security Resources Board. As far as it could be determined, however, no such bill was send to the Hill.

The reason that no bill was actually sent to Congress, is the reluctance of the Administration to have the government build the butyl plant. The Administration is fairly certain that Congress would authorize construction, for it has a written guarantee in the Senate Preparedness subcommittees' recent report on rubber of full support from the Armed Services committee.

What gives the Administration's rubber planners pause is their conviction that construction of additional synthetic rubber plants by the government does not square with national rubber policy, as enunciated by Congress, itself, and by the President. The keystone of this policy is that the government should divest itself of ownership of synthetic rubber facilities at the earliest practicable moment; that the advent of a healthy, competitive, privately owned and managed synthetic rubber industry should be delayed no longer than necessary.

The problem arises most clearly in the case of butyl, since there is general agreement that private ownership of butyl rubber facilities no longer poses the dangers inherent in competition from a superior-quality, low-cost natural rubber. Butyl has been accepted as at least the equal of natural rubber for automotive inner tubes, which now account for almost all butyl consumption, some 80,000 tons a year. Whether GR-S, in the present state of its development, could hold the substantial market deemed necessary for national security against a low-priced natural rubber is another question.

The Administration's rubber experts would like to see private industry undertake the construction of the necessary additional butyl capacity. The potentially interested firms thus far have begged off, however, on the ground that they cannot sell butyl in competition with government sales of this rubber at a price virtually equal to production costs. A solution would be to turn over existing butyl plants to private ownership since such action would offer private concerns the inducement necessary to build yet another plant, i.e., the removal of the barrier industry sees in government competition.

The logic of this approach is yet to be questioned. The approach, as a matter of fact, is yet to be proposed as Administration program. Since Congress has adjourned until January, Administration advocates of early disposal of butyl plants have a few months to try to drum up support among their colleagues and industry. If they get this support, it should not be too difficult to guess at the main planks of the report which the President is required to file with Congress in mid-January to guide that body on the plant disposal question.

How Congress, specifically Sen. Lyndon Johnson, who heads both the rubber subcommittee and the Preparedness subcommittee of the Senate Armed Services Committee, would take such a proposal is anyone guess. The Preparedness subcommittee's counsel, Donald Cook, told this reporter some weeks ago that the subcommittee wants the butyl plants built, and does not care particularly whether building is done by the government or by private interests. That was his response to a query on whether the subcommittee's request that the Administration submit legislation proposing government construction implied disfavor of having the butyl expansion undertaken by private capital. The situation at that time was even more hypothetical than today. Most likely it will remain so unless a responsible private concern shows some interest in erecting a butyl plant.

There is no question, incidentally, that the government stands ready to assist the construction of butyl facilities by private firms with adequate priorities for steel and other materials as well as with the customary certificate of necessity and accompanying rapid tax amortization privilege accorded to new defense facilities.

GR-S Output

RFC expects to attain an annual rate of 860,000 long tons of GR-S production by next June, provided the agency can get the steel and other materials required to bring about the planned 100,000-ton-a year in-plant production expansion. A spokesman said the agency is having some difficulty in acquiring such materials.

The expansion target includes conversion of enough "hot" rubber to attain a production rate of 645,000 tons of "cold" GR-S by next September, the agency said. Current production of all types of GR-S is close to 760,000 tons annually.

An indication of the improved supply was an NPA amendment to Order M-2, issued October 18, to stimulate purchases of residue rubber material which accumulates in the course of producing GR-S.

The amendment eliminated residue material from the order's definition of synthetic rubber, thus removing it from any allocation control. Previously, purchasers were required to charge one-fourth of their use of such material to their synthetic rubber allocations.

RFC said it has more than one million pounds of GR-S residue for sale. It plans to process further some of it for sale as refined residue. Some of the material will be sent to rubber reclaimers for processing into strips and sheets for sale as refined residue also. RFC will sell the remainder in unrefined form; the price will depend on the amount of moisture content.

GR-S Export

The government decided early in October to postpone the export of GR-S in substantial quantities at least until the first quarter of 1952. The matter of whether to authorize increased exports in the current quarter came up for inter-agency decision during the first part of October. It was decided not to establish an export quota for the material in the final quarter of 1951.

An official said the question will be reviewed again in time for a decision on first-quarter 1952 export policy. He said exports in quantities exceeding the nominal amounts now being shipped abroad for experimental purposes stand a better chance for approval early next year.

The government has been urged by Congress to start exporting GR-S to Western European countries of the NATO group in larger quantity as soon as sufficient supplies become available. The proposal was made in the third rubber report of the Senate Armed Services Preparedness subcommittee, issued in September.

Rubber manufacturers, generally, are reported in favor of building up stocks of GR-S in this country to a higher level before starting large-scale export of the material, a position supported by NPA's rubber division.

RFC Organization Changes

Reassignment of Gerald B. Hadlock, executive director of the Office of Rubber Reserve, was announced last month by the Reconstruction Finance Corp. The agency said that Hadlock, who held the post since the end of World War II, will be relieved of executive authority and replaced as soon as RFC can find a man to take the job.

Hadlock, a spokesman said, probably will remain with the agency as an adviser on synthetic rubber operations to the director of the Office of Production. This new job is a fulltime staff post to be created; so RFC can avail itself of the knowledge and experience Hadlock developed as operations chief of the synthetic rubber program.

ORR was redesignated in October as the Synthetic Rubber Division of the Office of Production. RFC is seeking an executive from industry to take over as chief of the division, the post relinquished by Hadlock. No other personnel changes or reorganization are contemplated, the agency said, although the titles of key organizational officials (but not their functions) have been changed.

The organizational changes are part of the overall structural changes made by RFC Administrator Symington in recent weeks. Symington announced October 9 that Arthur S. Barrows, a former president of Sears, Roebuck & Co., and former Undersecretary of the Air Force under Symington, will be director of the Office of Production. At the same time he announced the appointment of James A. Reid, on loan from the Phillips Petroleum Co., where he is assistant director of research and development, as technical director of the Office of Production.

Barrows and Reid will share executive authority of the Office of Production, which is charged with the responsibility for RFC's rubber, tin smelting, and abaca fiber production programs. Barrows will handle the business side of those problems, and Reid the technical and scientific phases, although all of the authority held by Barrows, as director, may be exercised by Reid as well.

Previous to these assignments Reid had held down the job of director of the Office of Production, and Barrows had served as a consultant to Symington, heading up such efforts as the development of a disposal plan for the government's synthetic rubber facilities. Reid came into the agency as an assistant to G. C. Oberfell, research director of Phillips Petroleum. Oberfell resigned in late April as special adviser on production to the board of directors of RFC.

The organization chart for rubber operations, as it stands after these changes, finds responsibility running from Symington down to Barrows and Reid and through them to the chief of the Synthetic Rubber Division. The Division will have the following branches:

Administration and Sales Branch, S. D. Morgan, chief; Research and Development Branch, Paul S. Greer, chief; and, Production Branch, Walter W. Munster, chief. The Research and Development Branch will have three sections, each to be headed by the official who was in charge of the same function under Rubber Reserve. There are a Polymer Research Section, a Polymer Development Section, and a Specifications and Publications Section. The Production Branch has two sections, one for Production Controls, and the other, for Plant Safety.

Latex Buying Plans

The decision to restore natural rubber latex purchasing to private hands loomed imminent in late October. After months of consideration, a special inter-agency rubber group recommended that exclusive government buying of this material be ended and that the government liquidate the stocks it accumulated since natural rubber latex was put on the stockpile list.

The recommendation was made to the Vital Materials Coordinating Committee, a top-level inter-agency group, headed by DPA Administrator Manly Fleischmann, which decides how critical materials are to be shared as between military and civilian needs. This group makes the ultimate decisions on the rate of stockpiling.

While problems incident to terminating exclusive buying were yet to be worked out, the general plan at which the General Services Administration was aiming shapes up as follows:

GSA would make contracts with dealers and/or manufacturers to purchase the natural latex now held by the government or contracted for overseas and yet to be delivered. With the conclusion of these contracts, GSA would step out completely as exclusive buyer—in fact would step out of the latex buying field entirely.

The time-table was quite indefinite. The end of exclusive buying was said to be 90 days away, or some time in early January or February. Considerable reluctance was expected on the part of dealers and manufacturers to buy up the government's "moderate" store of natural latex, partly because of inadequate storage space, but mostly for the same reason that prompted the government's desire to quit its latex stockpile project.

That reason is the development of superior types of synthetic latices, production of which is being stepped up sharply in the coming year. The increase, as recounted in an earlier report, was decided upon by RFC after considerable urging by the rubber industry, particularly the large manufacturers who see a large market in foam rubber goods opening up as a result of the development of high-quality, low-cost cold rubber latex.

Natural latex, as everyone seems agreed now, has just about priced itself out of a chance at participating in the greatly increased market seen by the manufacturers. At any event, the country soon will have ample capacity—some 50,000 tons a year—to produce all the latex it might need for war. About 30,000 tons or more of this total will be cold rubber latices.

When controls are removed on the buying of natural latex, the government is expected still to maintain some restriction to assure that industry keeps a few months' supply on hand. This plan might take the form of a minimum inventory edict by NPA.

Total stocks on hand or afloat today are put at somewhere around three months' supply, compared with the few weeks' supply on hand when the government put latex on the stockpile list. At that time consumption was riding a boom; whereas in recent months it skidded sharply, primarily because of consumer resistance to its high price.

The original stockpile target was modest, a goal of 5,000 tons held by the government and an equal quantity held by industry, or a total of 10,000 tons, as against current consumption of about 6,000 tons a month. With consumption at about half that level, a 90-day supply would measure up to that 10,000-ton goal. Industry stocks at the end of August were reported at 5,780 tons. Therefore the government probably has about 3,000 or 4,000 tons to get rid of.

"Thiokol" on Allocation

The NPA acted during October to "make a little of the supply" of "Thiokol" available for essential civilian consumption. On October 19 the agency ordered the material under allocation, with monthly allocations to begin November 1. "Thiokol" is being allocated as an Appendix A material under NPA Order M-45, the basic chemical order. Both the supplier and the purchaser must make monthly applications to NPA for permission to buy or sell "Thiokol."

The material is used chiefly in the production of self-sealing gas tanks for airplanes and as a ship-caulking compound. These uses have created a heavy defense demand amounting to 300% of recent production rates.

As a result, NPA said, civilian use of "Thiokol" was stopped entirely. The essential civilian uses for which NPA hopes to make small quantities available include pressure-tapes, heat gaskets for industrial and electrical appliances, brake bands, and diaphragms for gas meters.

With the material under allocation, NPA will be able to screen all requests for military uses. By suggesting substitute materials where practicable, NPA hopes to spread consumption of the current very tight supply a bit wider, it said.

Sulfur Use Limitation

The Defense Production Administration announced October 16 that it has ordered cutbacks in consumption of sulfur starting November 1. Its operating wing, the NPA, was to issue limitation orders by October 31 cutting most sulfur users to 90% of their 1950 rate of consumption.

Use of sulfur for making sulfuric acid or carbon bisulfide will be cut to 90%, although adjustments will be made for those plants supplying vital industries. Use of carbon bisulfide for making cellulose film or rayon will be cut to 90%, as will use of sulfuric acid for synthetic detergents, pigments, dyes, cellulose film or rayon, oils for finishing textiles, tall oil, and phosphate fertilizers.

NPA also was directed to issue additional curbs where study shows that further reduction in sulfur, sulfuric acid, or carbon bisulfide use will not affect a plant's production rate. This action is aimed at encouraging the use of substitutes.

Vital industries, such as steel, military explosives, synthetic rubber, petroleum, insecticides, as well as water purification treatment for public health, will be granted special allowances from the 90% limitation on sulfuric acid consumption.

NPA originally curbed sulfur consumption when it issued order M-69 in June, which limited consumption to 100% of the 1950 rate.

Tracy an NPA Director

Osgood V. Tracy, an authority on the production of butyl rubber, was named deputy director of NPA's Chemicals Division on October 14. He is on leave as general manager of the chemical products department of Esso Standard Oil Co. and has been engaged in the commercial development and production of petroleum chemicals for more than 20 years.

He is slated to succeed Kenneth Klipstein as division director when Klipstein returns to his post as an executive of the Calco Division, American Cyanamid Co., in early November.

Rubber Goods Pricing

Developments at the Office of Price Stabilization on rubber product pricing regulations were of minor consequence through October, as the price control situation generally remained moribund except in Congress.

The Administration's efforts to get Congress to repeal the Capehart amendment to the July extension of the controls act finally was stymied and put over to January. Price Director Michael DiSalle, faced with this at least temporary setback, was expected to start issuing regulations implementing the Capehart formula by late October or early November.

Chief provision of this amendment was that it requires OPS to grant manufacturers price increases to cover a wide variety of cost increases from Korea to July 16, 1951. It would rule out absorption of those cost increases by manufacturers, the policy set out by existing price controls regulations.

The Administration denounced the Capehart amendment as inflationary, and DiSalle argued that it posed impossible accounting and administrative problems on his office and on manufacturing concerns. The regulations expected to come from OPS will probably make some effort at circumscribing the accounting requirements; the chief one is the lack of uniform standards within industry for determining unit cost figures covering overhead expenses.

As for rubber goods pricing, OPS issued only one regulation as of late October: Amendment 3 to Supplementary Regulation 8 of Ceiling Price Regulation 22. The amendment, effective October 8, set out more clearly how manufacturers of certain new rubber products should determine ceiling prices. New products are those a manufacturer did not sell during the base period and therefore had no starting point at which to apply the various cost adjustment factors listed in SR 8.

The amendment, outlining in greater detail the various methods provided for such cases in CPR 22, stipulates that the manufacturer, if possible, select a comparable item and then apply this percentage mark-up to the current cost of the new item.

If the manufacturer lacks a comparable item, he can go through the same procedure by using the ceiling price of similar items sold by a competitor, preferably one of about the same size and doing the same sort of business.

If the manufacturer cannot use either of these methods, he can apply to OPS for a ceiling price.

GR-S Latex Prices

The OPS last month authorized the companies which handle less-than-carload-lot orders for GR-S latex to increase their selling prices by 1.5¢ a pound. The action was Amendment 1 to SR 57 of the GCPR. SR 57 was the order which previously authorized the 1.5¢ a pound increase for GR-S sold by RFC, effective with September shipments by the agency.

The pass-through of this increase by the seven firms handling lcl/shipments of GR-S latex took effect October 17. Because of a gap in OPS regulations these firms had been required to absorb the 1.5¢-a-pound increase granted to their supplier, the RFC.

The amendment to SR 57 corrects that situation. While RFC handles directly carload-quantity sales of its GR-S latex, sales of smaller quantities are made by the following firms, licensed by RFC to handle lcl business: American Anode, Inc., Firestone Tire & Rubber Co., Goodyear Tire & Rubber Co., General Latex & Chemical Corp., Heveatex Corp., Naugatuck Chemical Division of United States Rubber Co., and the Rubber Corp. of America.

The special amendment was needed because the pricing regulation which automatically allows distributers to pass on ceiling price increases granted OPS to manufacturers covers only those price increases granted under specific manufacturing regulations, such as CPR 22 and a host of others. It fails to cover, however, price increases granted to manufacturers (in this case RFC is the manufacturer) under the GCPR—a general pricing order covering all levels of business.

PVC Resin Prices

Manufacturers' ceiling prices for polyvinyl chloride resins will continue at levels prevailing under the GCPR, the OPS ruled during October.

The decision to continue on this basis was taken after computations under formulae of the manufacturers' regulation, CPR 22, employing as a base period July 1 to September 30, 1949, yielded ceilings for the five manufacturers of PVC resins substantially the same as those existing under the GCPR.

Imported Footwear Prices

The House of Representatives voted last month to retain the "American selling price" method as a basis for determining duties for rubber footwear imported into this country.

The decision came on a unanimous House approval of a trimmed-down Administration version of the Customs Simplification Bill. The State Department, in proposing the bill last January, asked that the few classes of products on which duties are calculated as a percentage of their American selling price be denied this special status.

Section 14 of the bill, as proposed by the State Department, would require that the *ad valorem* import duties on these articles be levied on the basis of their foreign wholesale price, the system used for other imported goods. The items granted exception to the generally applicable foreign wholesale price system are rubber footwear, certain chemical coal-tar products, and a few miscellaneous items.

The House voted on the bill October 15, sending it to the Senate. The Senate finance committee announced it will take up the measure in January. The Administration's effort to have Congress rule out of the existing law the American selling price was opposed by The Rubber Manufacturers Association, Inc., as well as by organized labor employed by the American footwear industry.

These opponents to the proposed change contended that it is impossible to get reliable figures on foreign wholesale costs of rubber footwear made in Czechoslovakia. Their major argument, however, was that the costs in Czechoslovakia reflect the use of low-paid "slave" labor. Calculating import duties (which are levied as a percentage of the cost) on the basis of such costs undoubtedly would allow foreign footwear to enter at a duty well below that currently prevailing and would constitute unfair competition to the domestic footwear industry.

The State Department, when it proposed abolition of American selling price, stated that it stood ready to increase duty rates to offset any lowering of import duty that might result from substituting foreign wholesale costs as the duty basis and that it had no intention of lessening the existing degree of protection long accorded to certain special classes of products, including rubber footwear.

This assurance of executive action to correct the prospective dangers foreseen by the rubber footwear industry and its workers through loss of the American selling price method of calculating import duty, however, was not enough to convince the House Ways and Means Committee. This group had considered the measure since early summer and successfully urged unanimous approval by the House.

Excise Tax Changes

The 1951 Revenue Act adopted in the final days of the recent session of Congress eliminated the 5%-per-pound manufacturers' excise tax on tires which are not more than 20 inches in diameter and 13¼ inches in cross-section, provided the tires are of all-rubber construction.

Congressional tax experts estimated that the elimination of this tax will result in a revenue loss of about $1,000,000 over a full year's operation. It has the effect of freeing from the manufacturers' excise those tires used for baby buggies, lawn mowers, children's tricycles, scooters, etc.

Since the manufacturers' price on such tires usually is low, the Congressmen pointed out, the 5¢-a-pound tax may account for as much as 25 to 50% of the price of the tires. The Senate finance committee had scored the tax as "unreasonably high in terms of *ad valorem* rates."

While the excise rate on sporting goods was raised from 10 to 15%, Congress exempted from the tax those items primarily used in schools and by children. Baseballs and other baseball equipment were included in the exempt list. The revenue bill provided a March 31, 1954, termination date for most excise tax increases.

The bill also exempted sales of refrigerator components to wholesalers or jobbers where the components are intended for resale to manufacturers or producers

of refrigerating and freezing equipment if the components actually are resold. Thus, sales of this type now enjoy the same exemption previously accorded to direct sales by component manufacturers to manufacturers of refrigerators and freezing equipment.

Other Industry News

Industry Outlook

James J. Newman, vice president of The B. F. Goodrich Co., in a talk before the Ohio Petroleum Marketers Association in Akron, O., early in October, declared that the United States and the rest of the world will continue to use rubber at an increasingly higher rate and estimated that in 1960 the world would use approximately 3,000,000 long tons of new rubber, nearly half of which would be man-made synthetic.

"The rubber industry set a high production level in 1950," Newman said, "by turning out 92,749,000 automobile and truck tires. We sold just under 100,000,000 tires, with the 7,000,000 difference between production and sales coming from industry inventories which were badly depleted at the end of last year and have remained that way ever since."

For the immediate future, the speaker predicted that the rubber industry would require several million more tires in 1952 than were needed this year to keep our transportation system rolling. One of the chief reasons for this replacement outlook, he said, is that the record production of 1950 cars and trucks will be coming into the market for replacement tires.

Harry E. Humphreys, Jr., chairman and president of U. S. Rubber, predicted an increase of 30% in the per capita consumption of rubber in the United States by 1960, in a talk before a group of editors and writers in New York on October 17. He reported that the rubber industry's sales have now reached the $5 billion level, with annual profits around $250 million, or about 5% of total sales.

Mr. Humphreys expressed the hope that the government would soon get out of the rubber business and would lease government-owned synthetic rubber plants to private industry so that prices for rubber, both natural and synthetic, could find their own levels based on supply and demand.

There are evidences that the supply of passenger-car tires is catching up with the demand, and a return to competitive salesmanship is now becoming apparent, he added. A 2½ to 5% reduction in the price of original equipment tires sold to the automobile industry was put into effect in mid-October. No change in prices at retail was made.

The new original-equipment schedule reduced by 2½% the price of passenger car-tires and small truck tires up to 8.25-20 in size. Larger truck tires were cut 5%.

More of the remaining controls on rubber usage may be dropped in the not-too-distant future, according to Dayton Rubber Co. in its dealer publication in mid-October.

Surveying opinions of industry leaders, Dayton said belief was general that restrictions on the replacement tire output and the order limiting manufacturers to one line of passenger-car tires may be lifted before many months.

"Until more natural rubber is made available to industry — and that's not likely to come in a hurry — the man-made synthetic product will continue to carry the lion's share of the load," Dayton stated. "Since truck tires use a high percentage of natural rubber, the outlook for an increased supply of truck tires for some period of time is not too bright. This is particularly true in view of the fact that the full impact of the government's armed services program on truck tires is still to be felt. Passenger tires may be available in plentiful supply. But truck tires won't be."

Dayton expressed the hope that rubber manufacturers and distributers would have a chance to build up depleted passenger tire inventories over the winter period, explaining: "If they can't, then you can look for a shortage next spring when the demand for passenger tires again peaks up."

Collyer on Taxation

Excessive taxation may cause rather than retard inflation, John L. Collyer, Goodrich president, told the Farm Equipment Institute in Chicago on October 3.

"Should taxation reach the point where private savings are inadequate to support proper upkeep and expansion of the private means of production, the alternatives are either a declining standard of living as productive facilities wear out and population increases, or the take-over of industry by government in the futile belief that bureaucracy can do with industry what bureaucracy, itself, has prevented private ownership from doing.

"By 1960, it is estimated that the United States will have 20 million more consumers, of whom only five million will be in the normally employable age groups. Those at work are likely to face the task of supporting not only a larger number, but also a much larger proportion of the population than in any previous period of our history.

"The bases on which taxes are levied may be different, the means of collection may be different, and the relative burdens on individuals different, but they all tend to make their final resting places in the consumer's pocketbook.

"The amount of private capital needed is great. American industry will have to invest, during the 1950's $200 billion, or possibly more in 10 years, almost as many dollars, though of lower buying power, as were invested in the last 30 years.

"With little apparent limit on the expanding scope and content of government functions, we may ask whether such great capital needs can be supplied from private means."

More Roads Needed

Both Goodyear and Firestone emphasized the need of an immediate expansion of the nation's program of highway construction, in public statements during October.

P. W. Litchfield, chairman of the Goodyear company, issued another of his "Notes on America's Rubber Industry," this one entitled, "Another Great Threat to Our Progress and Security," in which he pointed out that traffic congestion on our highways is costing the motoring public at least one billion dollars in extra operating costs aside from a mounting toll of accidents and property damage.

Harvey J. Firestone, Jr., in a coast-to-coast radio and television broadcast and in a series of full page advertising pages in leading newspapers throughout the country, stressed the fact that "America Needs More and Better Highways for Greater Highway Safety."

Litchfield in a chart called attention to the fact that highway use has far outstripped new road construction in the past 15 years. Whereas motor vehicle registration has increased 85% and total highway use has increased 100%, since 1935, highway construction, including rebuilding and modernizing older roads, is up only 17% for the period.

"Obviously we require thousands of miles of new highway construction, but it is equally essential that these additional miles be scientifically designed and located in relation to proven traffic needs," Litchfield said.

Public policies in highway matters, however, need revision and improvement along with the need of new and better roads, in Litchfield's opinion.

"We should take our highways out of politics and our highway thinking out of the pork barrel pattern," he added.

"The growing support for toll roads is a manifestation of public willingness to pay higher rates for better highway service. If we determine to make better use of the taxes and fees now supplied by highway users and then find that even more money is required to get results, I have every confidence that the public willingly will provide it.

"It isn't that we can't afford the cost of an adequate program of highway construction; It is that we can't afford the cost of an inadequate program," Litchfield concluded.

Firestone first called attention to the fact that highway accidents in 1950 took more American lives than the war in Korea and that this loss of lives makes it imperative that we vigorously apply ourselves to the vital cause of highway safety.

In these critical days, when defense needs of the nation demand the utmost efficiency in our transportation system, when materials and manpower are so scarce that the conservation of both becomes a national necessity, it is imperative that we concentrate our attention on the chaotic conditions into which our traffic system has fallen as a result of long neglect and the tremendous increase in motor vehicle travel. To delay any longer is to invite disaster which may cost thousands of lives and billions of dollars, Firestone warned.

Competent authorities say that it will take four to six billion dollars a year for the next ten years to build essential roads, to modernize existing highways, and to maintain our present system in satisfactory condition. This statement gives us some comprehension of the magnitude of the task that lies ahead.

All of us can make valuable personal contributions to the cause of highway safety by keeping our cars or trucks in safe driving condition and by supporting all measures which will speed up traffic, increase safety, and conserve essential manpower and materials. We should remember that our highways are vital to the future of our country, and all of us should do everything within our power to promote the cause of highway transportation and highway safety, Firestone concluded.

Labor News

The decision on that portion of the 13¢-an-hour wage increase granted United Rubber Workers of America, CIO, employes of the Big Four rubber companies during August and September, required from the Wage Stabilization Board, had not been reached in late October.

Since about 8¢ of the 13¢-an-hour increase was in excess of the allowable 10% permitted under WSB regulations, a special decision was necessary. A special review and appeals committee of the WSB refused to pass on the matter and referred it to the full Board for consideration. A decision by the full Board was expected by November 1.

Working out of supplementary agreements to the new contracts of some of the Big Four companies caused difficulties at the local level. The Passaic, N. J., plant of U. S. Rubber was closed for more than three weeks when the local CIO union went on strike because of disagreement with the company over seniority rights as applied when layoffs were necessary. The workers returned on October 19 with this problem about the same as before the strike began.

Ohio Rubber Co. and the URWA began wage negotiations in Cleveland, O., in early October. The union is seeking a 13¢-an-hour wage increase and a company-wide contract.

Sulfur Shortage Imminent

Sulfur stockpiles are at a minimum for national security and must not be further reduced, according to a report by Langbourne M. Williams, Jr., president of Freeport Sulphur Co., New York, N. Y. Although the long-range outlook is favorable, current sulfur production cannot meet demand, and, as a result, the United States faces a crisis in the coming months. Stocks have declined from a prewar peak of two years' supply to a present low of only six months' supply, Williams warned. Since the government has assumed complete control over distribution of sulfur, the government must determine which uses are more important to defense than others and direct shipments accordingly. Unless this policy is adopted, the shortage can have serious consequences on the entire defense program since sulfur is required in the manufacture of rubber, chemicals, newsprint, fertilizer, steel, petroleum products, textiles, explosives, paints, and many other products.

While many new projects are under way to increase the sulfur supply, it will probably take two years or more for much of the new production to be realized, Williams declared. Four new mines to produce brimstone, the principal domestic source of sulfur, are under development in Louisiana and Texas, and several other projects are being undertaken here and abroad to obtain sulfur from other natural sources. A realistic approach to the sulfur situation is needed now to prevent any further reduction of our essential inventories.

The Central Military Procurement Information Office of the Office of Small Business, Munitions Board, United States Department of Defense, Washington, D. C., moved to a new office in the Pentagon late in September. Previously housed in the Old Post Office Bldg., the office was moved at the request of businessmen who visit the Pentagon seeking ways in which they may participate in the defense production program. The Pentagon office is in Room 3-D-758; the former telephone number, LIberty 5-6700, Extension 66151, has been retained.

EAST

Buys Die Mold Firm

United States Rubber Co., Rockefeller Center, New York 20, N. Y., has acquired the assets of Chicago Die Mold Mfg. Co., Wrightwood Ave. and N. Pulaski Blvd., Chicago, Ill., custom molder of radio cabinets, dials, and other plastic products.

The business will be operated as Chicago Die Mold, Division of United States Rubber Co. The former owner, E. A. Petersen, will remain as manager, and there will be no change in personnel. The company currently employs about 120 people.

U. S. Rubber will make available to the plant increased scientific and technical resources and will expand production facilities to manufacture industrial products from its plastic compounds, Uscolite and Enrup. Uscolite is a new thermoplastic material with extreme toughness and exceptional chemical resistance. Enrup is a new thermosetting plastic suitable for use in gears, machine parts, housings, and other industrial products.

Personnel Notes

The appointment of George M. McTavish as manager of the government department of the tire division was announced last month by Wilson O. Green, general sales manager, tire division. McTavish succeeds Lawler B. Reeves, recently made sales manager, U. S. tires. In his new assignment, McTavish will assume all responsibilities in connection with tire purchases made by the federal government. He will maintain headquarters at the Detroit plant. He has held several key assignments in the U. S. tires sales organization including that of manager of aircraft tire sales. He spent much time during the past two years as a special representative in the company's government department offices in Washington.

George R. Vila, general sales manager of Naugatuck Chemical Division, has been honored by the U. S. Army for his services with the Technical Industrial Intelligence Committee of the Joint Chiefs of Staff during World War II. Mr. Vila received a certificate of appreciation from Major General C. G. Helmick, commanding general of the New England Subarea, for his work as a member of a group of six top-flight rubber scientists who investigated the research phases of the German synthetic rubber industry in 1945. Their findings in Germany led to the development of cold GR-S synthetic rubber in this country, as well as many other improvements in the quality and versatility of synthetic rubber.

New Ring Mat

A new boxing ring mat designed for greater safety to boxers has been developed for the New York Boxing Commission after months of research by Edward Dye, Cornell Aeronautical Laboratory, Inc. Introduced in Syracuse on September 18, the new mat was used in the Polo Grounds, New York, for the Saddler-Pep featherweight title match on September 26. The mat consists of a one-inch layer of Celotex topped by a layer of Ensolite, a crash-resistant material made by U. S. Rubber to Dye's specifications. The Ensolite is a cellular composition with unusual shock absorbing qualities.

American Polymer Corp., Peabody, Mass., has announced price reductions on its styrene-butadiene latices as a result of increased demand which has brought about larger production runs and lowered processing costs. These products find particular use in compounding synthetic latices. Polybutadiene latex Polyco 418, at approximately 30¢ a pound dry weight, has wide use in extending natural latex for the adhesive, foam rubber, dipped goods, and allied industries. Full descriptions of its products are given in data sheet P-24, available from the company.

Hood Rubber Co., division of B. F. Goodrich Co., Watertown, Mass., has developed new insulated rubber boots that operate on the "thermos bottle" principle and protect against frostbite even at —45° F., it is claimed. Replacing the shoe-pac, the new boots have been shipped to Korea for use by marines and army troops, after three seasons of testing in Alaska. The new boot consists of two layers of rubber with two plies of 19-ounce knitted wool insulation between them and is designed to be worn with only one pair of socks. The innermost layer of rubber is faced with nylon film to help prevent friction. According to Hood President Raymond H. Blanchard, effective insulation is created by the air trapped in thousands of tiny spaces within the knitted lining. This insulation serves as a barrier to transmission of outside cold and maintains body heat within the boot. A half-inch layer of wool felt, furthermore, insulates the inner bottom of the boot.

Sales Staff Changes

Several appointments in the sales organization of Columbia-Southern Chemical Corp., Pittsburgh, Pa., were announced October 21 by W. I. Galliher, vice president in charge of sales.

H. W. Gleichert becomes assistant to the vice president in the new sales organization.

E. W. Haley, formerly in New York, N. Y., moves to Pittsburgh headquarters as Columbia-Southern director of sales.

A. W. Reynolds was made administrative assistant to the vice president in charge of sales.

C. F. Bingham, manager of pigment sales, has been named assistant director of sales; while J. F. Dockum, Philadelphia, Pa., district sales manager, also has been appointed assistant director of sales.

Both Mr. Bingham and Mr. Dockum will headquarter at Pittsburgh.

P. A. Fodor of the market research and development department at Pittsburgh, will succeed Mr. Dockum at Philadelphia.

R. M. Simpson is now acting manager of pigment sales.

E. M. Rollins was named district sales manager at Dallas, Tex., with sales supervision of the Houston, Tex., and New Orleans, La., branch sales oces.

Moving from the corporation's Barberton, O., plant technical service department to the market research and development department at the main office is C. J. Stroemple.

The moves follow the recent change in corporate name when the organization became the Columbia-Southern Chemical Corp., a subsidiary of Pittsburgh Plate Glass Co.

The corporation produces chlorine, caustic soda, soda ash, and related chemicals.

Goodyear Appointments

Appointment of Henry G. Harper as vice president in charge of sales for The Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont., was announced last month by Vice President R. S. Wilson of Goodyear Tire & Rubber Co., Akron, O.

Two other changes were announced simultaneously by Vice President Victor Holt, Jr., to fill vacancies caused by Harper's promotion.

C. L. Metzger, since 1948 assistant manager of trade relations at Goodyear-Akron, succeeds Harper as manager of associated merchandise. Replacing Metzger is E. E. Lutwack, district manager, at Milwaukee, Wis., since 1946.

Harper, with the company 34 years, started as chief clerk in Charlotte, N. C., and held various sales positions in the district until 1928, when he was transferred to Richmond, Va., as branch manager. He returned to Charlotte as branch manager in 1934 and the next year became manager of the company's advertising department at Akron; in 1937 he was made western division manager at Los Angeles. Harper returned to Akron again in 1942 as merchandise manager of retail stores. The next year he was appointed assistant general manager of the retail stores division and in the same year was named manager of associated merchandise.

Metzger joined Goodyear in 1928 in the special goods department, later serving in the same capacity in the Cincinnati district until being assigned to the Louisville district as general-line salesman. Appointment as store manager at Charlotte came in 1932, and the next two years were spent as store manager at Birmingham, Ala., and Baltimore, Md. He was appointed assistant district manager at Chicago in 1937, district manager at Peoria, Ill., in 1939, and later, at Cincinnati. He was promoted to manager of tractor tire sales in 1943.

Lutwack, started with the company in 1927 as a service representative, later going to Charlotte as general-line salesman. He subsequently served as instructor in Goodyear's general-line sales school in Akron, field representative in the Memphis district and, in 1931, as a staffman in the petroleum sales department. After four years he was assigned to a general-line territory in Cincinnati and a year later returned to Akron in the sales promotion department. In 1937 he was appointed district manager at Jacksonville, Fla., and during World War II was a lieutenant colonel in the U. S. Army Air Forces.

Appointment of two new assistant comptrollers of Goodyear-Akron also was announced last month. Ray G. Woodling, manager, sales accounting department, and B. D. Scherer, chief works accountant for domestic rubber mill operations, received the promotions.

Woodling joined Goodyear in 1911 as employment office clerk and time-clerk and served successively as payroll clerk, production cost clerk, supervisor of the factory accounting department, staff employe of the comptroller's office, manager of the central cost department, assistant manager of the sales accounting department, and then manager of that department.

Scherer entered the company's production squadron 17 years ago. Following assignments as assistant works accountant at Goodyear plants in Jackson, Mich., and St. Marys, O., and at Goodyear Aircraft, he was appointed assistant manager in charge of factory cost accounting in 1943, being named works accountant in 1944. Three years later he was appointed assistant chief works accountant, and in April, 1951, Scherer was made chief works accountant.

E. H. Reed, former assistant manager of sales accounting, replaces R. G. Woodling, and W. W. Sauvary, former assistant chief works accountant, succeeds Mr. Scherer.

Mr. Reed started with Goodyear as a clerk in 1928. He later was transferred to miscellaneous accounting, where he became supervisor prior to being named assistant manager of sales accounting in 1940.

A member of the Goodyear organization since 1936, Mr. Sauvary handled statistics, engineering, and property records before being appointed assistant works accountant in 1944. He was promoted to assistant chief works accountant two years later.

Loren A. Murphy, division manager of Goodyear's purchasing department since June, 1947, has been named to the post of assistant to Vice President and General Manager T. A. Knowles, of Goodyear Aircraft Corp. For Murphy this marks his return to Aircraft, where he headed all the purchasing and sub-contracting activities through World War II. Responsible to Murphy will be the personnel division and the purchasing department, and in addition he will handle special assignments. Murphy joined Goodyear Tire in 1925 on a factory training assignment. Shortly afterward he entered the firm's purchasing organization.

The Decorative Fabric Co., 1115 Santee St., Los Angeles, Calif., has been named a West Coast distributer of Airfoam by Goodyear and will serve Southern California, New Mexico, and Arizona. It will service furniture manufacturers, interior decorators, upholsterers, and retail stores with this foamed rubber cushioning material.

Frank T. Magennis, vice president of the Goodyear Tire & Rubber Export Co., has been elected chairman of the board of directors of the International Road Federation, American region. The International Road Federation is sponsored by oil, motor, rubber, and construction equipment interests. It coordinates and disseminates around the world technical, economic, and social information concerning highways and highway transportation.

On September 23, 5:30 p.m. (ET), over the entire ABC network, Goodyear's outstanding radio program, "The Greatest Story Ever Told," began its sixth consecutive year on the air.

Goodyear in Japan

Tires and other products of the Goodyear company are to be manufactured and sold in Japan under the direction of a Japanese-Goodyear sales company recently organized by Goodyear in Tokyo, according to a statement on October 20 by P. W. Litchfield, chairman of the Goodyear board.

Although main offices of the new company are in Tokyo, production operations will be at Kurume, Japan, carried on under contract with Bridgestone Tire Co., a Japanese concern and one of the largest producers of tires in the Orient.

All tires and other products manufactured for Goodyear at Kurume will be according to company specifications and will bear the Goodyear brand name, Mr. Litchfield explained.

Officers of the Far Eastern operation, to be known as Goodyear Japan, Ltd., include R. W. Hadley, managing director, and H. B. Puckett, secretary-treasurer. Hadley was formerly manager of Goodyear's Far Eastern division; while Puckett was manager of factory accounting at the Goodyear plant in Brazil. Goodyear's production manager at Kurume is J. J. Hartz, formerly manager of product development compounding for the company in Akron.

Manufacturing operations are to get under way as soon as equipment can be readied and personnel trained, Mr. Litchfield said.

Both Hadley and Puckett are already in Japan. Others of the new organization are scheduled to arrive there in the near future.

Firestone Advances Meek

Joseph Meek, assistant industrial relations director, has been named general factory manager of the Memphis, Tenn., plant of The Firestone Tire & Rubber Co., Akron, O.

There has been a heavy increase in defense production in the Memphis plant, particularly in inflatable boats and floats. Memphis, largest Firestone subsidiary plant, has also absorbed a large portion of the defense production of tires and tubes.

Mr. Meek joined Firestone's cost department in Akron in September, 1925, was transferred to the time study department in 1926, and in 1928 was sent to Los Angeles, Calif., to establish the industrial relations department at the newly established Firestone subsidiary plant in that city. He remained there until 1942, during which time he served as personnel and production manager.

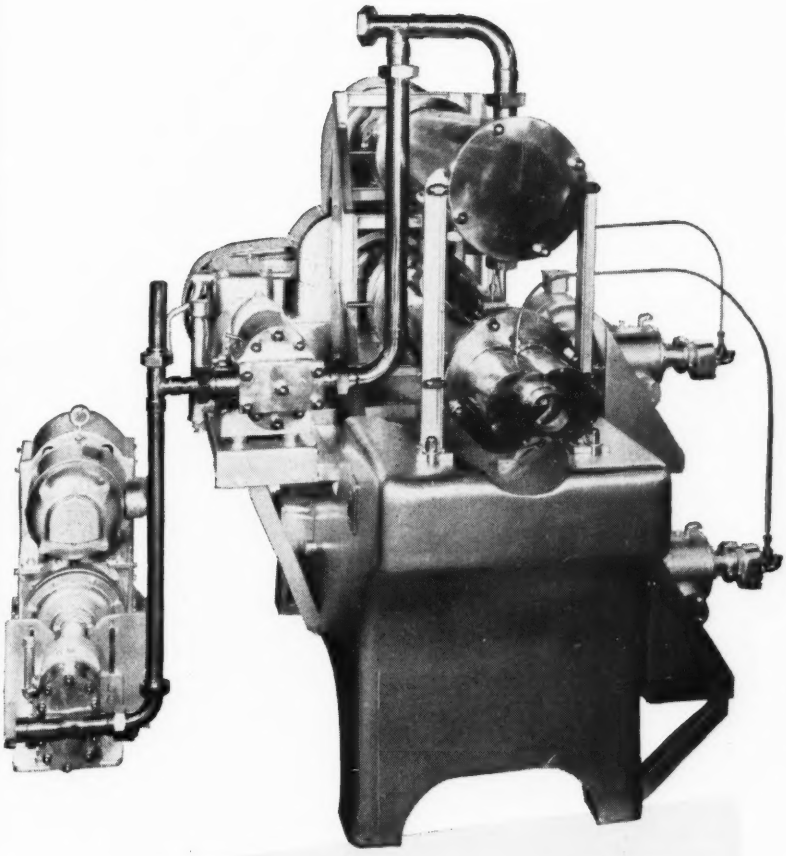
Mr. Meek was transferred to the Nebraska Defense Corp., a bomb loading plant operated by Firestone in Fremont, Neb., in January, 1942, and in 1943, was appointed general manager of the plant. In 1944 he was granted a leave of absence from Firestone to serve as Deputy Field Director of Ammunition Plants, U. S. Army Ordnance, and served as chief civilian adviser to the U. S. Ordnance Department, directing the operation of the more than 60 shell and bomb loading plants in the country. At the end of the war Mr. Meek received the War Department Exceptional Civilian Service Award for his outstanding work.

He returned to Akron, September 16, 1945, as assistant director of industrial relations at Firestone.

Celebrates Golden Jubilee

United Engineering & Foundry Co., Pittsburgh, Pa., is celebrating its fiftieth anniversary. To commemorate this event, the company has published a handsome illustrated booklet, entitled "United for Fifty Years," which highlights its past history and present position in the industry. Since its origin in 1901 through a merger of four companies, United has occupied a foremost position as a manufacturer of steel working machinery such as strip mills, slabbing mills, continuous electrolytic tinning equipment, and others. The booklet reviews the growth and accomplishments of the company, its wartime contributions, and its future prospects. In the discussion of United's subsidiaries, Adamson United Co. is noted as pursuing an active development program. This program includes work on a new mixer for processing rubber pellets into tire stock, an improved hydraulic press, a special press for sponge rubber products, new open steam vulcanizers, and further advances in Adamson's rubber and plastics calenders.

New continuous process for making foam rubber relies on TIMKEN® bearings



MARCO MANUFACTURING COMPANY mounts the shafts in the aerating and metering chambers of this new Flow-Master Foam Generator on Timken bearings. A total of 20 Timken bearings are used. Rigid shaft alignment is insured, close clearance maintained.

THIS new Marco Flow-master foam generator makes possible the manufacture of foam rubber by a continuous process instead of by the batch process. It is capable of turning out foam rubber to meet the industry's three standards: firm, medium and soft.

The shafts in the two aerating chambers and two metering chambers are mounted on Timken® tapered roller bearings, insuring close clearances, rigid alignment and continuous operation. Timken bearings provide long-life and trouble-free performance, keep maintenance time and costs to a minimum.

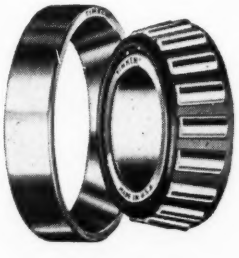
Due to their tapered design, Timken bearings carry both radial and thrust loads in any combination. Shafts are held in positive alignment, with a minimum of end-play and deflection. There's less wear on moving parts, resulting in longer machine life.

Line contact between the rollers and races of Timken bearings gives extra load-carrying capacity. And their true rolling motion and smooth surface finish virtually eliminate friction.

Timken bearings are engineered for the job. Precision manufactured of Timken fine alloy steel, they normally last the life of the machine.

Look and ask for Timken bearings on all the equipment you buy or build, and you'll get extra assurance of dependable, low cost performance, plus long machine life. Insist on bearings with the trade-mark "Timken". The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

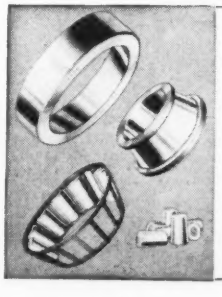
This symbol on a product means its bearings are the best.



TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS



DESIGN LEADERSHIP

The first Timken tapered roller bearing was produced in 1898. Since then the one-piece multiple perforated cage, wide area contact between roll ends and ribs, and every other important tapered roller bearing improvement have been introduced by The Timken Roller Bearing Company.

The Timken Company leads in: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. special analysis steels.

NOT JUST A BALL ○ NOT JUST A ROLLER ⬭ THE TIMKEN TAPERED ROLLER ⬭ BEARING TAKES RADIAL ⓘ AND THRUST →ⓘ← LOADS OR ANY COMBINATION

G-E Developments

General Electric Co., Schenectady, N. Y., has announced that its Calrod electric cartridge heaters are being used at the Waynesville, N. C., plant of Wellco Shoe Corp. to make foam rubber midsoles and vulcanize them to shoe uppers in 12-18 minutes. Wellco "welds" a layer of foam rubber between a soft leather outsole and the insole. Vulcanizing is accomplished in a specially designed machine consisting of an electrically heated last and bottom plate, and a mold. The thin outer sole is placed into the bottom mold, and on this are laid the felt and uncured rubber strips reinforced with fiber. The shoe last is then placed on the plate, and the mold closed. Under the more than 300° F. heat furnished by the G-E heaters, the rubber puffs to the desired thickness and cures within 12-18 minutes.

G-E 12853, a new fast-curing phenolic compound that speeds cure time on molded parts, has been developed by G-E's chemical division. The new compound is recommended for those applications now being molded with general-purpose phenolics. Cure time is substantially reduced because the new material is capable of being preheated to higher temperatures than conventional general-purpose phenolics. Preheating and mold temperatures can be widely varied to regulate flow, permitting the use of G-E 12853 in a range of applications and enabling the molder to reduce the number of compounds he must stock. Produced in a black color, the new compound combines good physical and electrical properties, imparts good finish and high gloss to molded parts, has excellent preforming characteristics, and may be finished by conventional methods, it is claimed.

The chemical division at Pittsfield, Mass., has announced that silicone rubber-treated glass cloth for motor and cable insulation is now in production at the G-E Coshocton, O., plant. According to H. K. Collins, manager of the division's laminated and insulating products department, a continuous dipping process is used. The glass cloth is passed through a liquid solution of silicone rubber, and heat is used to cure the rubber. The treated cloth is being produced in 36-inch widths and thicknesses of 4-10 mils. It is anticipated that other uses for the cloth will be developed in the electrical industry.

Personal Mention

Arnold Kneitel, of the chemical division, Pittsfield, Mass., will transfer to the silicone plant at Waterford, N. Y., as a member of the headquarters' sales organization. Formerly silicone sales representative in the New York area, Mr. Kneitel started with General Electric in 1947 on the chemical and metallurgical training program and then assumed responsibilities as silicone sales representative.

William Brandenburg takes over silicone sales duties in the New York area. Mr. Brandenburg joined the chemical division for silicone indoctrination at the Waterford plant in April. He formerly worked with Bakelite Corp. as research and development chemist and with the Barrett Division of Allied Chemicals & Dye Corp. as a sales representative.

William L. Rodich has been promoted to assistant general manager of the laminated and insulating products department of the chemical division. Prior to joining General Electric in 1950, he was superintendent of manufacturing for S. B. Penick & Co. and had been affiliated with Merck & Co. and Winthrop Chemical Co. In June, 1950, he was named manufacturing manager of the chemical materials department at G-E.

On his new assignment, Mr. Rodich will be located at the headquarters of the laminated and insulating products department in Coshocton, Ohio. His appointment was necessitated by increased business activity, and the post was newly created.

Harold Reintjes

Reintjes Joins Cabot

Godfrey L. Cabot, Inc., Boston, Mass., carbon black manufacturing concern, has appointed Harold Reintjes special assistant to C. A. Stokes, director of the research and development department. Mr. Reintjes has also been named vice president and general manager of Petrocarb Equipment, Inc., New York engineering firm owned jointly by Cabot, The Carborundum Co., The Gas Machinery Co., and Hughes By-Product Coke Oven Corp.

Mr. Reintjes was associate director of the Illinois Research & Development Division of Great Lakes Carbon Corp. for the past five years and has been engaged in research and development in an administrative, engineering capacity since graduation from the Rose Polytechnic Institute in June, 1935. Mr. Reintjes, a registered professional engineer, is also a member of the American Chemical Society and is active in the American Institute of Chemical Engineers. His office address will be 30 Vesey St., New York, N. Y.

Hercules Powder Co., Wilmington, Del., has made Paul A. O'Neill its St. Louis sales representative for the naval stores department, to replace Joseph M. Carbonara, who has been transferred to the export department in Wilmington to handle sales of company products in Cuba, Venezuela, Mexico, and Colombia. Mr. O'Neill, with the naval stores department in Wilmington since 1931, is succeeded by E. Milton Regier, with Hercules since 1941, working principally in the vinsol resin sales and market research division

Changes at General Tire

The management of the mechanical goods division of The General Tire & Rubber Co.—including operations at Logansport and Wabash, Ind., and Jeannette, Pa.—has been transferred to the company's main offices in Akron, O.

Howard Dodge, general manager of the mechanical goods division, W. J. Gurtner, controller of the division, T. H. Winklejohn, chief engineer, and Robert Iredell, Jr., product engineer, all have moved from Wabash to Akron.

C. P. Bender, works manager, will direct all operations at Wabash and Logansport plants, with the exception of sales, which are to be handled by W. A. Wright, division sales manager. Both men will operate out of Wabash offices.

The expansion and reorganization of General's truck, tractor, and industrial sales departments was announced last month by Vice President L. A. McQueen. Sales of all tires, including airplane types, and air suspensions for truck-trailers will be coordinated under the newly created commercial sales division. Karl A. Dalsky, manager of truck tire sales at General for the past 20 years, has been named to head up this new division. There will be five marketing activities under the jurisdiction of the new division, with each activity headed by an assistant manager.

Paul E. Shobert, in charge of manufacturers sales, will devote full time to the creation of additional business in the replacement field. With General since 1939, Shobert was previously in charge of aviation and farm tire sales.

D. G. Gehring, former Boston branch manager, has been placed in change of all branch and distributer activities in the farm markets as manager of agricultural sales. Gehring has been with General since 1931.

J. A. Beckett, recently transferred from the engineering division to the sales department, will be in charge of contractor and construction sales, with emphasis on special purpose tires. With General since 1928, Beckett will concentrate his activities on large tires used in mining, logging, and construction work.

Robert Moran, previously in charge of industrial tire sales, will be given the added responsibility of creating and developing the market for General's new air suspension for truck-trailers.

C. G. Myers has been named to head bus and taxicab tire sales and will deal with contracts handled directly by the Akron office.

Witco Elections

At a recent meeting of the board of directors Jerome S. Harrison was elected vice president of Witco Chemical Co., 295 Madison Ave., New York 17, N. Y., and designated manager of the Chicago office. Mr. Harrison, with the Witco sales office 26 years, succeeds the late David Tumpeer in charge of the Chicago office.

Frederick C. Wissemann was elected financial vice president; while William Wishnick was designated to take over Mr. Wissemann's former position as treasurer. George J. Klipper was made assistant treasurer.

Samuel Kahn recently joined the technical staff of Witco's research laboratory in Chicago as a group leader. Mr. Kahn comes to Witco from Godfrey L. Cabot, Inc.

For More Ethyl Chloride

Shell Chemical Corp., 50 W. 50th St., New York 20, N. Y., through President Jan Oostermeyer, has announced that it will expand its ethyl chloride production capacity at Houston, Tex. Ethyl chloride is an essential chemical, being used in the manufacture of tetraethyl lead, ethyl cellulose, and such varied items as waterproofing compounds, lacquers and varnishes, transparent wrapping films, and coated paper and textiles. Raw materials for the synthesis of ethyl chloride are ethylene and hydrochloric acid, the latter to be available as a coproduct in a vinyl chloride plant also being constructed at Houston.

"Shell Chemical Corp. and Diamond Alkali Co. are pooling their resources to manufacture and market vinyl chloride monomer," Mr. Oostermeyer said.

Shell will supply the ethylene from petroleum; while Diamond Alkali will supply the chlorine from ordinary salt. This integration of operations by the two companies is occasioned by the complementary nature of their raw material situations at Houston, where the plants are adjacent.

Expanding Sulfur Output

In a move aimed at alleviating the critical shortage of sulfur and sulfuric acid, Shell will add to its Houston, Tex., operations a unit for recovering sulfur from waste refinery gases. Output of the new unit will be sold for conversion to sulfuric acid, according to Vice President W. P. Gage. The new unit will be constructed by Ralph M. Parsons Co., and operation is expected by mid-1952. In the process, waste refinery gases containing hydrogen sulfide, carbon dioxide, and a small percentage of light hydrocarbons will be burned and catalytically converted to sulfur at an annual rate of over 13,000 tons.

Thermoid Buys Essex

Fred Schluter, president of Thermoid Co., Trenton, N. J., last month revealed that his concern has acquired stock control of the Essex Rubber Co., also in Trenton.

Thermoid manufactures automotive and industrial rubber, asbestos and textile products. Essex manufactures rubber soles and heels and other molded products.

The latter company was founded in 1907 and from an original investment of $2,500 has grown to present annual sales of approximately $3,000,000 and total employment of 350. Thermoid, which had sales of $30,000,000 in 1950, operates plants in five states.

Following announcement of the sales, negotiated with Joseph Hewitt, president of Essex, Mr. Schluter said, "There is no change contemplated at this time in the operating personnel at Essex."

It is expected that Thermoid products will be manufactured at the Essex plant as facilities warrant.

U. S. Rubber Reclaiming Co., Inc., Buffalo 5, N. Y., recently added to its research staff Paul E. LaValley, formerly technical director of Charles Howe Corp., and Joseph Green, recent recipient of a master's degree in chemistry from the University of Kansas.

Hardware Show a Success

A new record in number of exhibitors, 722 firms, was set at the 1951 National Hardware Show, held in Grand Central Palace, New York, N. Y., October 8-12. A complete sell-out, the Show occupied all four floors of the Palace. While exact registration figures were still unavailable, total attendance was believed to be equal to or better than the record of 31,737 set last year.

Business placed during the Show was reported at a high level, particularly in the sporting goods and housewares lines where buyers were stocking up for the coming holiday season. While demand was brisk for other hardware items, manufacturers of metal goods were reluctant to take on large orders in view of uncertainty as to material allocations and availability.

Among the rubber exhibitors, golf, tennis, and other athletic balls were shown by J. A. Dubow Sporting Goods Corp., Dudley Sports Co., Kasselberg-Griffith Co., Ohio-Kentucky Mfg. Co., Pennsylvania Rubber Co., Sportsman's Golf Corp., Sun Rubber Co., and W. J. Voit Rubber Corp. Rubber housewares, including mats, drainers, plumbing equipment, etc., were displayed by H. O. Canfield Plumbing Supply Co., Central Rubber Products Co., Inc., Hancock Mfg., Inc., Knickerbocker Rubber Co., Martin Rubber Co., Inc., and Pretty Products, Inc.

Shoes with rubber heels and soles for athletic and industrial use were exhibited by Boston Athletic Shoe Co., Brooks Shoe Mfg. Co., Empire Specialty Footwear Co., and Worcester Shoe Co. Other rubber displays noted at the Show included hose, belting, and tape by L. H. Gilmer Co., division of United States Rubber Co.; tape and matting by Plymouth Rubber Co., Inc.; sponge rubber weatherstripping by Kravex Mfg. Corp.; playballs and decoy ducks by Dewey & Almy Chemical Co.; and industrial pneumatic wheels by Gleason Corp.

In the plastics field, general house displays were shown by Owens-Corning Fiberglas Corp., and Tennessee Eastman Co., division of Eastman Kodak Co. Vinylidene plastic screening was exhibited by Arvey Corp.; Firestone Plastics Co.; Lumite Division, Chicopee Mfg. Co.; and Plastic Woven Products, Inc. Firestone also had on view its plastic yarn and film. Household and industrial brushes with nylon bristles were shown by Empire Brushes, Inc., and Modglin Co., Inc.

Vinyl plastic extruded garden hose, shower hose, and clotheslines were exhibited by Alan Plastics Corp., American Extruded Products Co., Industrial Synthetics Corp., Mayon Plastics, Plymouth Rubber Co., Inc., and Sandee Mfg. Co. Wide varieties of plastic housewares, including dinnerware, cutlery handles, tumblers, refrigerator dishes, tool handles, and other items, were featured by Beacon Plastics Corp., Gits Molding Corp., Gotham Industries, Inc., Mastercraft Plastics Co., Inc., New Plastic Corp., Plastics Mfg. Co., Republic Molding Corp., Rogers Plastic Corp., and Rona Plastic Corp.

Plastic and plastic coated clothing for sportsmen were shown by Dri-Clad Division, W. Shanhouse Sons, Inc.; Seal-Dri Sportswear Co., Inc., and U. S. Fiber & Plastics Corp. Plastic markers and signs were exhibited by LaBarb, Inc.; Noma Electric Corp. displayed Christmas ornaments; plastic toilet seats were shown by Century Plastic Products, Inc., and Herculean Appliance Corp.; and a full line of plastic boxes and containers for all purposes was featured by Gilbert Plastics, Inc.

Opens Chicago Plant

Stein, Hall & Co., Inc., 285 Madison Ave., New York, N. Y., has opened a new plant for the manufacture of Hallmark Brand industrial adhesives in a recently purchased three-story building at 3750 S. Loomis Pl., Chicago, Ill. The new plant has 19,000 square feet of floor space and has been equipped with special new production equipment and a large modern laboratory. Armond P. Coppola, formerly at the firm's Long Island City plant, has been named plant manager of the new Chicago unit. Kenneth Arnold is manager of the Chicago sales office, and general supervision of the plant will be carried out by Lawrence Gussman, vice president in charge of manufacturing. Hallmark adhesives are formulated to customers' needs from vegetable, animal, casein, latex, and resin bases.

Morris S. Rosenthal, president of Stein, Hall & Co., was the United States delegation to the U. N. Economic Commission for Asia and Far East Regional Conference on Trade Promotion, held at Singapore from October 9 to 18, to discuss international trade and world economic conditions.

Faultless Rubber Elects

Stockholders of The Faultless Rubber Co., Ashland, O., at their recent annual meeting elected the following directors: N. R. Duell, C. D. Hubler, W. A. McAfee, Geo. A. Meiler, T. W. Miller, Jr., J. C. Myers, and Western Wiles.

At the board meeting, following the stockholders', the following officers were elected: Mr. Miller, president; Mr. Wiles, vice president in charge of sales; John G. Roppel, vice president in charge of manufacturing; Mr. Duell, vice president in charge of planning and procurement; Mr. Meiler, secretary and treasurer; C. W. Ebert, comptroller and assistant treasurer; R. L. Charlton, assistant treasurer; and R. C. Johnson, assistant secretary.

New Foam Rubber Adhesive

Anchor Adhesives Corp., 36-23 164th St., Flushing, N. Y., has announced the development of Softseam, a new adhesive for fabricating foam rubber. The new product is said to be an improvement over other adhesives because the seam formed by the cemented surfaces remains soft. Softseam is easy to apply, has immediate grab, cures quickly, has no depression tack after four hours, and requires no mixing, it is further claimed. Use of the new adhesive permits the fabrication of intricate shapes from foam rubber for use in pillows, mattresses, upholstered chairs, and other applications. Literature on the fabrication of foam rubber with Softseam is available from the company upon request.

The Timken Roller Bearing Co., Canton, O., appointed George T. Humphrey, Jr., assistant general manager of the service sales division. Humphrey, who leaves his post as assistant branch manager of the division at Dallas, Tex., was instrumental in developing Timken distribution centers in Mexico.

Goodrich Appointments

Emerson G. Hammack has been named manager of metal parts purchasing for The B. F. Goodrich Co., Akron, O. Succeeding him in his previous post, manager of engineering equipment purchasing, is Fred D. Stinaff, who reports to Hammack.

The latter has been in the purchasing departments since he joined Goodrich 32 years ago. He has held all offices in the Purchasing Agents Association in Akron and has been a director in the National Purchasing Agents Association.

Stinaff has been with the company 26 years, in purchasing for the last eight.

J. Terry Taylor has been named manager of the track departments of the Akron tire division, which are responsible for development and manufacture of various types of rubber tracks, solid tires and bogie wheels for military vehicles. Taylor joined the company 12 years ago in the works laboratory. Later that year he entered the tire division as a test engineer. He served as technical group head in industrial tire construction until 1945, when he joined the field engineering department, where he worked on engineering problems with Detroit automobile manufacturers. Taylor returned to Akron this year to accept his present assignment.

Delbert L. Crone has been named production manager of the track departments, reporting to Taylor.

Safeguarding Employe Health

"Safeguarding the health of workers in the rapidly expanding man-made rubber industry is again a major responsibility," William E. McCormick, Goodrich industrial hygienist, told the Fourth Regional Gulf Coast Industrial Health Conference at Houston, Tex. The rubber industry is not only a huge consumer of chemicals, but a large producer as well. New materials with their unknown hazards are constantly being developed, and toxicological and industrial hygiene studies of these new chemicals must be made if they are to be used safely.

McCormick discussed some of the problems existing in the rubber industry. Butadiene is highly inflammable, and necessary precautions must be be taken to prevent fire and explosion. The material must be stored and transported under pressure and insulation, and also tends spontaneously to form explosive peroxides upon aging unless made with an inhibiter. Styrene requires the same precautions against fire as does butadiene, and workroom atmospheres require ventilation.

"From the standpaint of severity of hazard, number of persons exposed, and quantity of material used, the solvents are of major importance as health hazards," McCormick said.

In addition to the various systemic problems associated with the use of solvents, there is always the problem of dermatitis, which is often the more difficult to control. Some chemicals used only in minor quantities also present health problems, McCormick declared. An example is dinitrochlorobenzene, which is systemically toxic, may be a severe sensitizer, and requires elaborate precautions to prevent skin contact.

George Woloch Co., Inc., dealer in rubber and plastics, has moved to larger quarters at Room 605, 82 Beaver St., New York 5, N. Y. Telephone: HAnover 2, 1171-2-3-4-5.

Albert J. Slatter

The Bridgwater Machine Co., Akron, O., has centralized and consolidated all its tire mold manufacturing in its enlarged Athens Machine Division plant at Athens, O.

Albert J. Slatter has been made general manager of The Athens Machine Division. Widely known as a tire design and construction engineer, Mr. Slatter was with The Dunlop Tire & Rubber Co. for many years and later was general manager with The Armstrong Tire & Rubber Co., Natchez, Miss.

Boston Woven Hose & Rubber Co., Cambridge, Mass., in its recent annual report to shareholders revealed that company directors have authorized expenditure of about $1,000,000 for a new reclaiming plant as present facilities are inadequate for production requirements and are to a considerable extent outmoded. The new plant has been designed to produce a better product at a lower cost and in quantities sufficient to meet the company's increasing requirements.

Ground was broken last month for this plant, which is expected to be completed next spring. W. L. Larkin, vice president and treasurer, James W. Walton, factory manager, and Mayor Edward Crane, of Cambridge, participated in the ceremonies at 29 Hampshire St.

Using an air separation process developed by company engineers, the new factory will help conserve scarce rubber supplies by extracting all usable material from scrap auto tires and other waste rubber. The entire output will go into the company's own manufacturing operations, which include a large volume of government orders.

Hayden A. Glatte has been appointed general sales manager of the Tile-Tex division of The Flintkote Co., 30 Rockefeller Plaza, New York 20, N. Y., to succeed J. O. Heppes, who has resigned. Mr. Glatte has been with Flintkote for the past ten years, four of which were spent in a sales administrative capacity for the Tile-Tex division, with headquarters at Chicago Heights, Ill.

Tile-Tex is known throughout the flooring industry as one of the oldest and largest asphalt tile manufacturers. Since its acquisition by Flintkote in 1945, manufacturing operations at Chicago Heights have been expanded and also extended to New Orleans for the Tile-Tex division, to Los Angeles for the Pioneer division, and to Toronto for The Flintkote Co. of Canada, Ltd.

Dunlop Tire & Rubber Corp., in Buffalo 7, N. Y., last month elected Howard E. Elden, vice-president (research and development) and John E. Swalm vice president (manufacturing). Mr. Elden formerly was technical director; while Mr. Swalm was production superintendent under the late Russell D. Belden, vice president in charge of manufacturing.

WEST

Forms Foreign Subsidiary

Officials of Minnesota Mining & Mfg. Co., St. Paul, Minn., on October 12 predicted foreign sales upward of $30,000,000 for 1952, the firm's first full year of direct operations in European and South American markets.

The estimate was made as Board Chairman Wm. L. McKnight and President R. P. Carlton announced formation of a wholly owned subsidiary to develop and handle 3M's foreign interests, to be known as Minnesota Mining & Mfg. International Co. R. W. Young has been named president.

Minnesota Mining formerly engaged in manufacturing activities abroad through Durex Corp., in which it had a 28½% interest. It engaged in export through Durex Abrasives Corp. in which it had a similar interest. Both corporations were organized with other American abrasive manufacturers in the late 1920's under the terms of the Webb-Pomerene Act.

Durex Corp. was dissolved earlier this year in accordance with a government directive. Young was associated with the Durex companies during the entire period of their existence, having served as president until 1948, when he became board chairman.

In 1952, 3M International anticipates total foreign sales in excess of $30,000,000, as compared with a 28½% interest in the total Durex activity for 1950 of approximately $21,000,000.

Young said 3M International plans to develop production and sales organizations for the complete line of 3M products in as many countries as possible.

3M International now has sales forces operating and plants in production in Canada, England, France, Brazil, Germany, and Mexico.

Plant facilities are being expanded in Great Britain, at Gorseinon, Wales; in Germany, at Dusseldorf; in France, near Paris; in Canada, at London, Ont.; and in Brazil.

Other plants will be built as demand for products grows, Young said. He indicated that several additional plants are already contemplated.

Besides coated abrasives the foreign plants are now manufacturing, or soon will be manufacturing, "Scotch" cellophane, electrical, sound recording, masking and industrial tapes, "Scotchlite" reflective sheeting, coatings, and sealants.

The full line of 3M products also includes roofing granules, lithographic plates and other graphic arts products, plastic

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ribbon, gummed tape, crushed rock products, synthetic rubber and chemicals.

With the establishment of 3M International many of these products are being sold in foreign markets under their domestic trade marks for the first time.

In addition to Young, 3M International's panel of officers includes Clarence B. Sampair, vice president; Allan H. Butz, vice president in charge of sales; Carlton H. Corwin, vice president in charge of production; and Wm. A. Thomas, vice president in charge of engineering.

Sampair, a veteran of 24 years' service with 3M, is vice president in charge of production for the parent company.

Butz has 25 years of service with 3M, most recently as general sales manager of the coated abrasives division.

Corwin joined 3M in 1926 and transferred to Durex in 1929. After serving as manager of various Durex plants, he became a vice president of that organization in 1945.

Thoms was a member of 3M's engineering staff for nearly 20 years before assuming a similar post with Durex in 1947.

Producing "Fluorochemicals"

Minnesota Mining has announced the manufacture on a semi-commercial scale of a new series of "fluorochemicals." These compounds are being made by a patented electrochemical process in a recently completed plant near Hastings, Minn. All of the products are carbon compounds containing a high percentage of fluorine, and many are believed to be new and unique. According to President Carlton, the fluorochemicals give the firm its first basic position within the chemical industry and permit greater diversication of the company's product line. The method of manufacture uses no free fluorine, is a single-step process, and is potentially cheaper than other processes. The fluorochemicals serve as a new group of chemical intermediates for use in the manufacture of other products and provide better heat and chemical stability, resistance to weather, fire, and fungi, greater surface activity, and unusual optical properties. Among products that may eventually be affected are resins and coatings, pharmaceuticals, dyes, polymers, solvents, dielectrics, hydraulic fluids, and others.

Kirkhill Rubber Co. moved into its new offices and factory in Brea, Calif., during September, after completely outgrowing its Los Angeles plant facilities. The new factory had been under construction for more than a year, with production units commencing operation as soon as they were completed. The new plant has more than three acres of floor area and is set on a 20-acre tract which provides space for future expansion. According to General Manager W. J. Haney, further expansion is already under way. In six months the plant will comprise more than 200,000 square feet of floor space at an expansion cost of more than $1,000,000. Of special interest is a greatly expanded research laboratory with modern equipment which will allow Kirkhill engineers to cooperate more closely with product development engineers throughout the rubber industry. New and larger mills, calenders, presses, and extruders are in operation to provide greatly increased production of standard and custom molded parts, lathe cut goods, extruded products, sponge rubber, sheeting, and silicone rubber products.

Wins Award

Phillips Petroleum Co., Bartlesville, Okla., has been announced as the winner of the 1951 Award for Chemical Engineering Achievement given by *Chemical Engineering*. Presentation of the award will be made during the week of the chemical exposition in New York, N. Y., at a subscription dinner on November 28 at the Waldorf-Astoria Hotel. According to the awards committee, headed by Professor Alfred H. White, University of Michigan, two interrelated achievements won the award for Phillips: commercial development since 1948 of high abrasion carbon black and major contributions to the successful development of cold rubber.

Phillips Petroleum is redeeming on November 13, at 102½%, the balance of its outstanding 2⅜% debentures due 1975, which were issued May 1, 1950.

Self-styled champions of the natural gas consumer are trying to hoodwink the public into believing that federal control of producers and gatherers of natural gas would mean more gas at lower prices, when the fact is that it would mean less gas at higher prices, K. S. Adams, chairman of Phillips Petroleum, told more than 600 business and civic leaders of the greater Kansas City, Mo., area at a luncheon on October 15. The producer and gatherer receives only a small fraction of what the home consumer pays for gas, Adams declared. Although the Federal Power Commission recently ruled that producers and gatherers, such as Phillips, are not subject to regulation under the Natural Gas Act, this decision will probably be appealed to the courts. Meanwhile the producers and gatherers are hesitating to sell gas in interstate markets because of the threat of federal control. With the rising industrial demand for gas in the southwestern states, suppliers to other areas may be adversely affected if federal regulation becomes a reality, Adams warned.

Waldron in New Post

Ball Brothers Co., Inc., Muncie, Ind., has appointed Zach K. Waldron, for three years with the Johnson Rubber Co., sales executive for the new Ball rubber products division, to be responsible for establishing an entirely new sales organization that will be needed as the Muncie firm broadens its production lines and becomes more specialized in the manufacture of rubber products. He will be responsible for establishing several new sales offices in key cities, for staffing his new sales organization, and for directing and expanding sales so as to broaden both the number of products Ball will manufacture and to makes its production more specialized. Mr. Waldron is active in The Rubber Manufacturers Association, Inc., and also is a member of the government's price stabilization advisory committee for mechanical rubber goods. The new Ball rubber sales manager has had wide experience in sales, manufacturing, and accounting and has specialized in product development, sales engineering, and market research, in which three capacities he has served various manufacturers in the electrical, textile, metal, wood, and rubber industries.

Creation of a new consumer products sales division and the appointment of William E. Palmer to direct the development of a broader range of consumer goods for Ball Brothers were announced last month by G. Fred Rieman, vice president in charge of sales.

The new Ball sales executive will report to Mr. Rieman at the home offices in Muncie as manager of marketing in charge of the new sales organization. The new division, Mr. Rieman said, will be responsible for the sale of Ball home-canning supplies and for the development of consumer products that may be sold on a year around basis.

Mr. Palmer recently resigned a five-year association with Benton & Bowles, New York advertising firm, to join the Muncie firm.

Changes RSL Set-up

Monsanto Chemical Co., St. Louis, Mo., has announced that its Rubber Service Department at Akron, O., has been integrated with the organic chemicals division, in a move to increase the company's service to the rubber industry and to broaden the responsibilities of its personnel.

C. W. Christensen, of Akron, general manager of sales of the Rubber Service Department, was named assistant general manager of sales of the organic division. W. P. Metzner, of Nitro, W. Va., Rubber Service research director, was made associate director of research for the division. John R. Durland, of Nitro, continues as manager of the West Virginia plant; while James F. Hand, of Akron, assistant sales manager for Rubber Service, becomes manager of sales for Rubber Service products.

OBITUARY

Arthur H. Zieske

ARTHUR H. ZIESKE, 61, vice president and general manager of Goodyear Farms, Litchfield Park, Ariz., died October 24 in a Phoenix, Ariz., hospital after an extended illness.

Mr. Zieske combined his boyhood experiences on a farm near Cleveland, O., with his training as a draftsman, engineer, and builder to direct Goodyear's agricultural operations and experimentation in Arizona.

Vice President Zieske joined the Goodyear Tire & Rubber Co. in 1910 at Akron as a draftsman for the mechanical engineering department. Later he was placed in charge of the drafting room and then, in addition, construction supervision of the work as well. He went to Gadsden, Ala., in 1929 where he engineered construction of the company's factory there. In 1933 he was sent to California to restore the company's plant at Los Angeles following the damage caused by an earthquake. Prior to that he had been in England looking over the present site of the company's tire plant at Wolverhampton. He was assigned to Goodyear Farms in October, 1933, as manager. He was appointed vice president in 1940.

He was a vice president of the Litchfield Park Kiwanis Club and a vice president of the Roosevelt Council of Boy Scouts in Maricopa County.

Mr. Zieske is survived by his wife, two sons, and a daughter.

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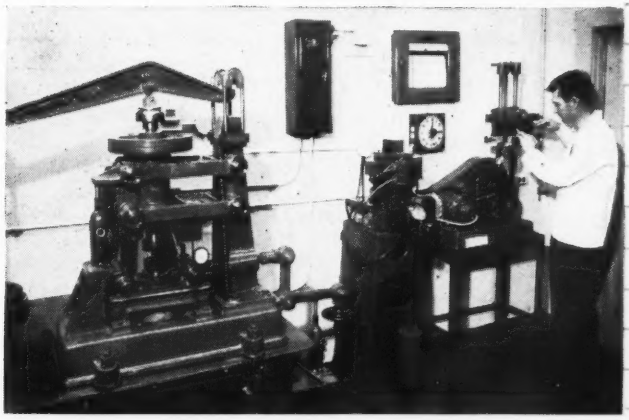


Sectional view of constant temperature-humidity test room
St. Joe Flexometer, special type flexometer,
DeMattia flexing apparatus.

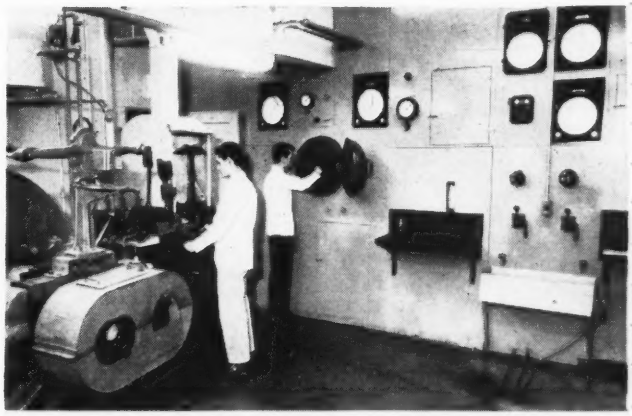
FURNACE BLACKS

Continex SRF

Continex SRF-NS

Continex HMF

Continex HAF



Sectional view of laboratory mill room showing
rubber mills, open steam vulcanizer, curing presses.

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Jacob H. Linxweiler

JACOB HEINRICH LINXWEILER, president of Intercontinental Rubber Co., Inc., New York, N. Y., died October 10 in a Norwalk, Conn., hospital after a short illness.

Born in South Norwalk, Conn., on October 10, 1891, the deceased was educated in the grade and high schools there and also at the Merrills Business School.

In 1917, approximately two years after having served with the traffic department of the New York, New Haven & Hartford Railroad, Mr. Linxweiler joined Norwalk Tire & Rubber Co., where he became district manager. In April, 1927, he joined Intercontinental Rubber Co. as sales manager, became treasurer in 1942, but left in 1947 to join Springs Mills, Inc., as personnel director. He continued, however, as director of Intercontinental and became president of that company and its subsidiaries in 1950.

The deceased was a member of the B.P.O.E. in South Norwalk.

Mr. Linxweiler leaves his wife, a son, and a daughter.

Funeral services were held October 13 in St. Joseph's Church, South Norwalk, followed by interment in Riverside Cemetery, Norwalk.

Russell D. Belden

RUSSELL D. BELDEN, 62, vice president of Dunlop Tire & Rubber Corp., Buffalo, N. Y., died suddenly September 27 while on a fishing vacation in Canada.

A native of Akron, O., Mr. Belden attended schools there and was graduated from Buchtel College.

Then Mr. Belden was employed by Miller Rubber Co., Akron, but in 1918 went to Marion Tire & Rubber Co., Marion, O.

In 1920 he moved to Buffalo, where he was made production superintendent of Madison Tire Co., and in 1923 joined Dunlop as technical manager, maintaining that position until 1930, when he was appointed vice president in charge of manufacturing.

The deceased was a member of the Buffalo Athletic and Park Country clubs.

Surviving are his wife and one son.

James P. Chittum

JAMES PAUL CHITTUM, technical sales representative for Kralastic and Vibrin resins, Naugatuck Chemical Division, United States Rubber Co., New York, N. Y., died October 3 at a Waterbury, Conn., hospital after a lengthy illness. Funeral services were held at the First Methodist Church in Waterbury on October 6.

Born in Wapello, Iowa, on July 8, 1912, Dr. Chittum joined U. S. Rubber in 1937 as a research chemist in its general laboratories in Passaic, N. J. There he did much of the fundamental research work which led to the company's entry into the plastics field. For the past five years he helped introduce polyester resins and the styrene resin-nitrile rubber blends to the plastics industry as a technical sales representative for Naugatuck Chemical. As their popularity grew, he assumed the responsibility for sales in the New England territory.

The deceased held a doctor's degree in chemistry from Columbia University and also was a member of the A. C. S., SPE, SPI, and American Plastics Assn.

CANADA

Rubber Consumption Down

Overall stocks of rubber in Canada at the end of July—natural, synthetic, and reclaim—were 36% larger than a year earlier, and consumption was slightly lower, the Dominion Bureau of Statistics reported. Domestic production of synthetic and reclaim showed a combined advance of 13%.

Stocks of natural rubber on July 31 amounted to 5,379 tons, against 3,561 a year ago; synthetic, 3,673 tons, against 3,297; and reclaim 2,345 tons, against 1,532. Consumption of natural rubber totaled 3,284 tons, against 3,626; synthetic, 1,862 tons, against 1,682; and reclaim, 1,115 tons against 1062.

The month's output of synthetic rubber totaled 5,434 tons, against 4,777 tons, and production of reclaim reached 202 tons, against 193.

Consumption of rubber in July, 1951, as compared with that in June, 1951, shows a decrease in natural of 112,123 pounds, an increase in synthetic of 74,956 pounds, and a decrease in reclaim of 188,613 pounds. The total decrease was 225,780 pounds. Considering the situation in terms of end-product use, it may be noted that the consumption of all rubber in the production of tires and tubes, including tire repair materials, increased by 828,779 pounds; consumption in rubber footwear decreased by 506,034 pounds, in wire and cable, by 220,951 pounds, and in other products, by 327,574 pounds.

Total stocks of rubber on August 31 reached 12,496 tons, contrasted with 8,194 tons on the corresponding date of 1950. Natural rubber stocks were 6,499 tons, against 3,521; synthetic, 3,637 tons, against 3,109; and reclaim, 2,360 tons, against 1,564.

Consumption of rubber in August amounted to 5,869 tons, against 6,001 tons a year earlier: natural, 2,832 tons, against 3,079; synthetic, 1,944 tons, against 1,947; and reclaim, 1,093 tons, against 975.

In August synthetic rubber production totaled 5,036 tons, against 4,977 tons in August, 1950; reclaimed rubber, 477, against 385 tons.

More Synthetic in Tires

A greater proportion of synthetic rubber will soon be used in the production of Canadian automobile tires. Some manufacturers expect to use at least 25% more synthetic by the end of 1951. First deliveries of synthetic rubber from the expanded facilities of Polymer Corp.'s Sarnia, Ont., plant are now being made. Tire makers expect an increase of 10-15% in their allocations of synthetic rubber and by year-end, when the Sarnia expansion is complete, an increase of 35-40%.

Until now the proportion of synthetic rubber in Canadian-made auto tires has been much smaller than in the United States. Canadian manufacturers have not been able materially to increase their purchases of synthetic rubber because Polymer has been operating at capacity and also has sizable export commitments. Practically all the additional production from Polymer's $9,000,000 plant expansion will go to the Canadian rubber industry. The expanded capacity, plus the development of Krynol, which gives more rubber from the same amount of butadiene and styrene, is expected to increase Polymer's output by as much as 35-40%. The increased supplies of synthetic rubber will immediately be reflected in lower natural rubber imports.

Rubber Price Steady

Prices of crude rubber in Canada have been steady to strong over the past month, according to the Purchasing Agents' Association of Toronto. July imports of crude rubber into Canada amounted to 7,668,094 pounds, with the average cost per pound, 59.6¢. Comparative figures for July, 1950, were 4,720,763 pounds and 26.7¢. For the first seven months of this year the average importation cost of crude rubber was 60.3¢ per pound, as compared with 19.1¢ for the corresponding 1950 period. The report states that there should be a sharp decline in Canadian natural rubber imports for the balance of this year owing to generally lower production rates in the Canadian rubber industry and the increased availability of synthetic rubber from Polymer Corp., Ltd.

New Financing Plan

A public offering of $1,500,000 5% 15-year first-mortgage sinking fund bonds of Gutta Percha & Rubber, Ltd., Toronto, Ont., is being made at 98.50 to yield 5.15% by a group of investment houses headed by W. C. Pitfield & Co. Proceeds are to be used to redeem $735,000 first-mortgage bonds currently outstanding, to repay anticipated $275,000 bank overdraft, and for general corporate purposes including plant extensions and equipment for production of a special high-pressure flexible hose.

The present company, formed in 1912 to acquire the business founded in 1833, is one of the largest independent rubber companies in Canada. Net earnings for the six months ended June 30 of $314,873 compare with $331,816 for the full year 1950. Balance sheet of June 30, giving effect to current financing, shows current assets of $4,439,986 and current liabilities of $1,254,073.

Mailman Corp., Ltd., has acquired the manufacturing facilities and assets of Cambridge Rubber, Ltd., at St. Remi de Napierville, P.Q., by purchase of the latter firm's capital stock. The sale includes a license arrangement for Canada on certain of the Cambridge trade marks and patents. Officers of the new company are: president, A. S. McLean; vice president, S. G. Wellheiser; and secretary-treasurer, Roger W. Varey.

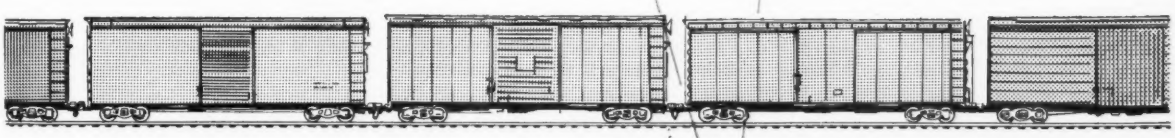
The General Tire & Rubber Co. of Canada, Ltd., has placed privately a $2,000,000 issue of 5% sinking fund debentures due November 1, 1969, guaranteed by The General Tire & Rubber Co., Akron, O. General of Canada recently extended its operations by acquiring Joseph Stokes Rubber Co., Ltd., Welland, Ont., now operating as its Stokes Division. Proceeds from the debentures are being used for general corporate purposes including repayment of advances made by the parent company for the Stokes purchase.

more SILENE EF & HI-SIL are on the way!

Columbia-Southern is spending several million dollars on a new plant and research facilities in Barberton, Ohio, to expand its production of Silene EF and Hi-Sil.

This expansion assures a greater supply of these two important pigments for customers and potential users. As the production capacity of this plant moves into high gear, you can rely on Columbia-Southern to better service your needs for Silene EF and Hi-Sil.

In the meantime, it is suggested that you plan now to use these extraordinary pigments in your rubber compounding . . . to take advantage of the new supplies as they become increasingly available.



Both SILENE EF® and HI-SIL® are exclusive non-black rubber reinforcing pigments developed by Columbia-Southern.

SILENE EF—Precipitated hydrated calcium silicate; particle size .03 micron; 2.10 sp. gr. It has high modulus, good tensile, high tear and abrasion resistance.

HI-SIL—Precipitated hydrated silicon dioxide; particle size .025 micron; 1.95 sp. gr. It has high modulus, tensile and tear and extremely high abrasion resistance.

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NEWS ABOUT PEOPLE

John R. Lill

John R. Lill has been appointed manager of the new chemicals division of J. M. Huber Corp., 100 Park Ave., New York 17, N. Y. This new division will supervise and expand the manufacture of pigments, accelerator activators, and other chemicals used in rubber processing. Headquarters will be at Borger, Tex., which is also headquarters of Huber's carbon black and oil and gas divisions. Mr. Lill, a practicing chemical engineer for the past 12 years, was formerly with the Mutual Chemical Co. of America as production superintendent and assistant to the plant manager.

Alvah Small, vice chairman of Underwriters' Laboratories, Inc., 207 E. Ohio St., Chicago 11, Ill., has left that organization after 45 years for a well-deserved rest in Florida.

R. B. MacKenzie has been appointed assistant sales manager of The Parker Appliance Co., Cleveland 12, O. His primary assignment will be the coordination and handling of activities resulting from the government's increasing defense program requirements for Parker material produced by the company's fitting, valve, jet part, and Rubber divisions. MacKenzie came to Parker in 1941 from the Pharis Tire & Rubber Co., where he had served as assistant advertising and sales promotion manager. His most recent post was Parker sales engineer in the Philadelphia-Washington, D. C., area.

Frank D. Hendrickson, president of American Hard Rubber Co., New York, N. Y., is serving as chairman of the rubber industry group for the 1951 Travelers Aid Society campaign.

I. Drogin, director of research, United Carbon Co., Inc., Charleston, W. Va., talked in Philadelphia, Pa., September 27 before the Philadelphia Printing Ink Makers Production Club on "Some Aspects of Ink Grade Carbon Blacks." He pointed out that the printing ink industry last year bought 51,000,000 pounds of black, equivalent to a little over 4% of the carbon black sold domestically.

Edward R. McLean, since April, assistant to the manager, has been made manager of the planning section of the nylon division, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. He succeeds Cantwell Clark, who retired September 30. Mr. McLean was first employed by du Pont as a chemist in explosives and after six years and several promotions became a technical assistant manager in the foreign relations department. Mr. McLean joined the rayon department on January 1, 1948, in the planning section of the acetate division. Then from June 1, 1949, to April 1, 1951, he filled area and chief supervisory posts at the acetate plant, Waynesboro, Va.

L. F. A. Mitchell has been made division product sales manager for General Cable Corp., New York, N. Y.

Wenzel A. Lindfors has been made sales manager of New York Belting & Packing Co. and will make his headquarters in the company's Passaic, N. J., plant. Mr. Lindfors will direct all sales of industrial rubber products, such as transmission, conveyer, and elevator belting, water, air, and gasoline hose, packing, molded and extruded goods. He was formerly factory representative for the company in Minnesota, northern Wisconsin, North and South Dakota, and northern Iowa.

George N. Brunt has joined Southern Latex Corp., Austell, Ga., as general manager. For the past 20 years he was with Flintkote Co., New York, N. Y.

Bernard Ludwig has been promoted by Dewey & Almy Chemical Co., Cambridge, Mass., to the managership of the adhesives and coatings division, which produces resin emulsions for use in industrial packaging, and side sealing tapes as well as thermoplastic coatings for collapsible tubes. Formerly an adhesives salesman in the company's Chicago office, Mr. Ludwig came to Dewey & Almy in April, 1950, from the Step-Master Shoe Co. Previously he had been in sales for Mallinckrodt Chemical Works, which he had joined after World War II.

Alf E. Werolin, formerly managing partner of McKinsey & Co., management consultant, in charge of its activities in the 11 western states, recently was elected vice president of National Motor Bearing Co., Inc., Redwood City, Calif., with portfolio of administration and planning.

T. F. Shaffer has been appointed manager of the special products department of Shell Oil Co., 50 W. 50th St., New York 20, N. Y., to succeed R. T. Goodwin, retired. Mr. Shaffer, a veteran of 14 years with Shell, started as a salesman in Ohio and advanced through many technical and supervisory jobs concerned primarily with lubricants and industrial products. He comes to his new post from his former position as divisional department manager, lubricants, at Los Angeles.

Evert Pearcy

Evert Pearcy has been added to the sales department of Sid Richardson Carbon Co. Fort Worth, Tex., and will work out from the firm's general sales office in the Evans Bank Bldg., Akron, O. Mr. Pearcy, after four years in the United States Army, joined Ferro Enamel Corp., as a sales engineer and spent six years selling and also supervising the installation of Ferro units in this country and abroad. His foreign service included work in Puerto Rico and India.

George W. Poland, Jr., has been elected vice president of E. M. Sergeant Pulp & Chemical Co., Inc., 7 Dey St., New York, N. Y., and president of its subsidiary, Sergeant Chemical Co., Newark, N. J. Mr. Poland recently resigned as assistant sales manager of Stauffer Chemical Co.

Kenneth J. Plants has been appointed general sales manager of the plastic film division, Goodyear Rubber Sundries, Inc., New Haven, Conn., in line with the company's plans for greatly expanded activities in the plastic film field. His headquarters are at the general sales office of the division which recently opened in New York, N. Y., at 500 Fifth Ave. Regional offices in other cities will be established in the near future. Mr. Plants began his career in plastics with the Bakelite Division of Union Carbide & Carbon Co., then moved on to respresent Firestone Plastics Co., and still later the plastic division of Reynolds Metals Co.

Merle J. Sanger recently was appointed to serve a 90-day tour of duty with the Munitions Board, Pentagon Bldg., Washington, D. C., in the capacity of a technical consultant to the Board's Chemicals & Rubber Section. Mr. Sanger had been technical superintendent of the mechanical goods division of The General Tire & Rubber Co. at Wabash, Ind., and in November, 1950, had moved to Akron, O., to head up the new rubber products development group of General's research and development division.

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Moe Muscles knows he's not a magician, but you can't blame him for taking some credit for the performance of Dow Corning Silicone mold release agents. Molded parts almost pop out of Dow Corning silicone treated molds, and he knows it. Release becomes a positive thing. It's more than freedom from sticking, even in molding heavily loaded stocks, heavy duty tires, precision moldings, or parts formed in complicated or deep cavity molds.

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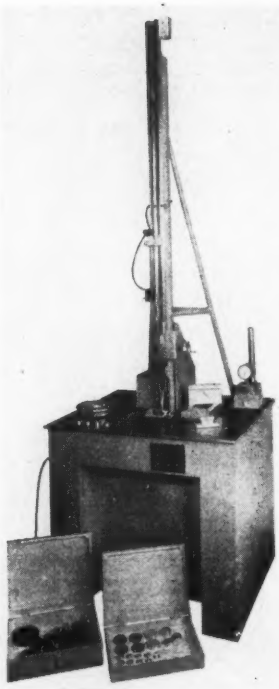


New Scott Strain Tester with Sets of Additive Weights

New Strain Tester

A NEW strain tester which performs elongation tests on rubber and other high elastomers in accordance with methods developed by the National Bureau of Standards has been announced by Scott Testers, Inc., 112 Blackstone St., Providence 1, R. I. The instrument was developed initially by the Bureau and subsequently modified by Scott.

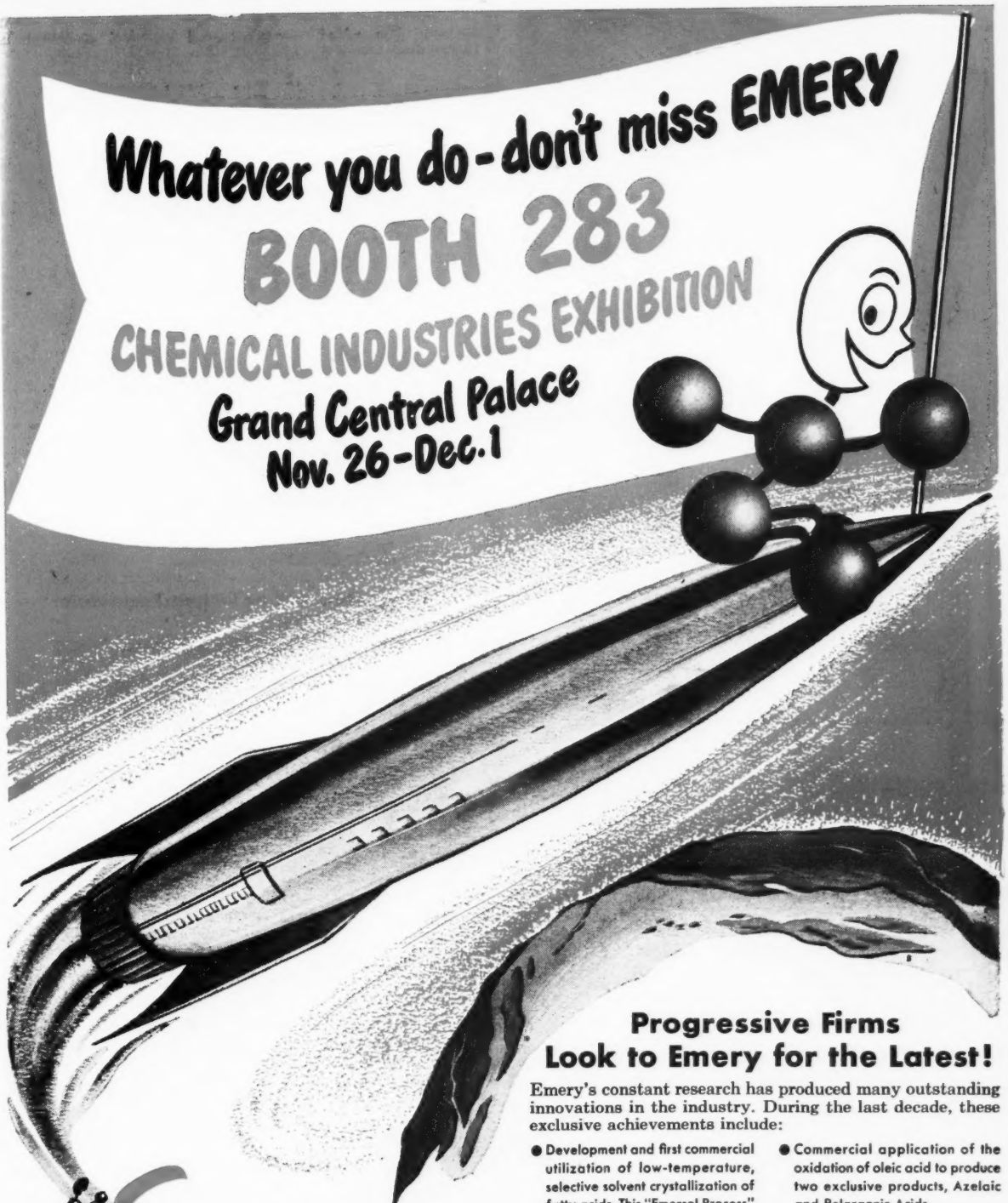
The outstanding advantage of the new tester is its unique method of additive weight loading which is simple and positive. Selection of the additive weights is accomplished mechanically without the use of electrical circuits. The operator simply gages the specimen for thickness, then turns the additive weight control hand-wheels so that the numbers appearing before the pointer correspond to the thickness. These hand-wheels rotate the additive weight trays by chain and sprocket drive and accurately position the correct combination of weights over the pins of the additive weight holder.

There are four sets of additive weights, one for each of the 50-, 100-, 200-, and 400 psi. stress ranges. These sets are arranged in numbered positions in trays to provide positive identification. Each set consists of 18 additive weights arranged in two circular trays in the base of the machine, and a fixed weight positioned separately below the trays.

The machine performs the standard test for determination of strain, expressed as a percentage of the original sample gage length known and constant unit stress. All weighting mechanisms are housed in the base, and the machine is designed so that

Roads Rough?

SEE PAGE 134



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- Colgate-Emery Process for the continuous high-pressure splitting of fats.
- Discovery and plant scale utilization of the patented, high-temperature, continuous dimerization process for producing di-linoleic acid (Emery 955 Dimer Acid).
- Commercial application of the oxidation of oleic acid to produce two exclusive products, Azelaic and Pelargonic Acids.
- Production of the first solvent crystallized, low-titer vegetable fatty acids for alkyd resin manufacture.
- Introduction of Emersol 132 Lily Stearic Acid, the highest quality crystalline stearic acid available.
- Production of Emersol 233LL Elaine, the world's purest commercial oleic acid.

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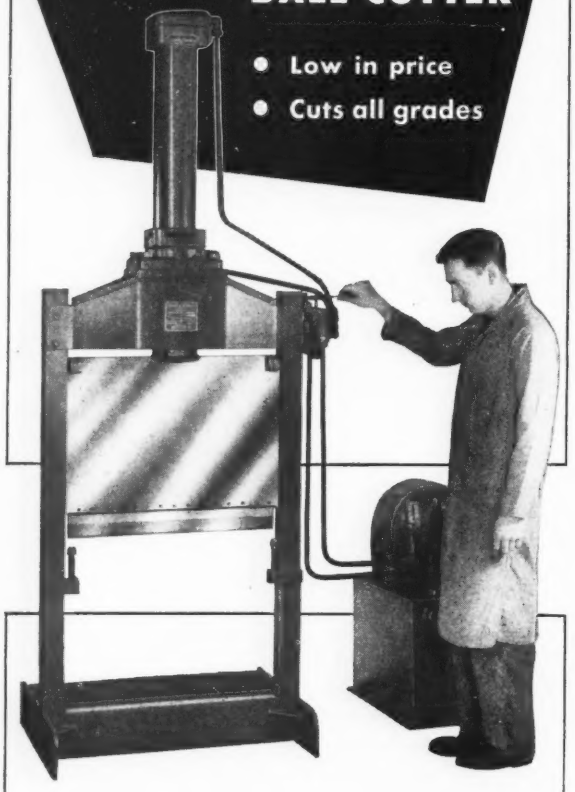

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Top performance...low operating cost...maximum safety--these are the three main reasons why the Holmes Crude Rubber Bale Cutter is in daily use in so many leading plants in the rubber industry.

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Improved Water Bath

PRECISE control of water bath temperatures to a degree never before attained is claimed for the new Fisher Isotemp bath, made by Fisher Scientific Co., Pittsburgh 19, Pa. The constancy of temperature claimed for the new bath is ±0.005° C. over its entire range of about —5 to +107° C., and actual tests have produced variations as small as 0.002° C. over a long period of time. This extreme constancy is of particular importance in laboratory work involving viscosity or density measurements.

Unlike the conventional water bath, the new unit employs an electronic circuit to control one 400- and 800-watt heater. The heating elements, stirrer, and controls are contained in a central column with all connections made through the bottom of the Pyrex glass bath, thus providing an unobstructed top surface for inserting samples. Stirring is done by an 1,150-rpm. motor and propellers so that the entire 10-gallon bath content (water or light mineral oil) is in constant motion.

The bath is housed in a cube-shaped case with a front opening for observing samples under test. The back and the bottom portions of the bath are ground and illuminated from below by fluorescent lamps for maximum visibility. Samples inserted through any of the eight openings in the rotatable cover may be turned to the front of the bath for observation. An accessory cooling oil is available for use in work at lower than room temperature.

Hose Test Stand

PRODUCTION of a new Model S-221B hydraulic hose test stand which provides permanent records of tests has been announced by Sprague Engineering & Sales, Gardena, Calif. Designed for impulse and cycle tests of complete aircraft hose assemblies in accordance with specifications AN-H-24 and AN-H-28, the machine will also make burst tests up to 25,000 pounds per square inch.

Intended for laboratory use, the Model S-221B is housed in a steel cabinet having two compartments at the top and one across the bottom. The upper left-hand compartment, which is the testing chamber, is lighted and equipped with two access doors having safety glass windows. The upper right-hand compartment houses the electronic equipment required to indicate and record the pressure impulse pattern. This compartment is sealed off from the testing and control compartments and is adequately ventilated. The oil reservoir, pumps, motors, and controls occupy

(*Continued on page* 250)

Consider the SPEED

Camachine 26-3A operates smoothly at speeds up to 400 fpm depending upon characteristics of the material, number of cuts, web tension, and machine width.

Consider the ROLL QUALITY

Differential rewind assures uniformly wound rolls regardless of minor variations in caliper across the width of the web.

Consider the ECONOMY

Long years of trouble-free service are attested by the records. For example, a manufacturer of mica products reports 26 years of continuous satisfactory performance.

MODEL 26-3A slitter for coated or tacky materials

Speeds up to 400 fpm. Strips widths to 1" with Pneucut slitters, ½" with Integral type slitters, or ¼" with Special slitter units.

You are invited to consult with Camachine engineers regarding your roll production requirements. For complete information on Camachine 26-3A send for Bulletin 1010.

CAMERON MACHINE COMPANY
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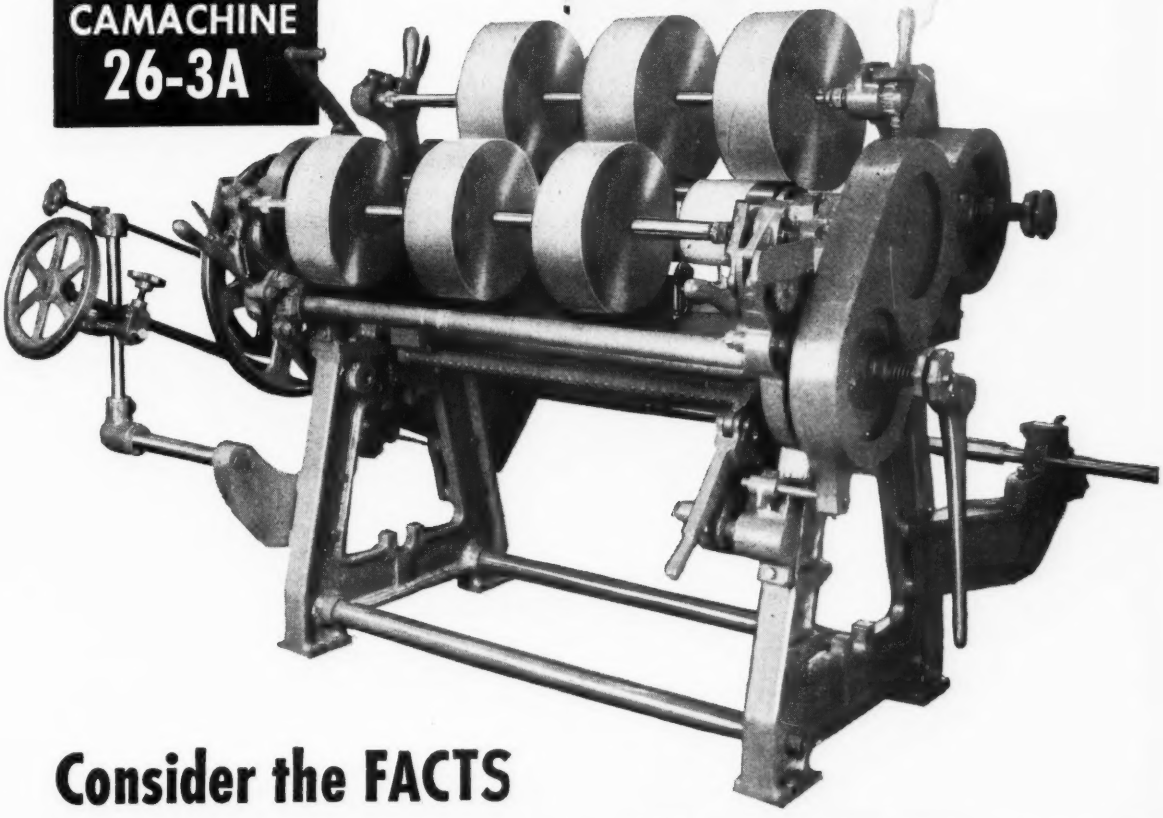
Consider the VERSATILITY

Camachine 26-3A handles many different types of plain and coated materials of varying caliper, including .002 acetate film and .020 insulating papers.

CAMACHINE 26-3A



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- 90% less down time
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- 1/7 power required
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The Fidelity Knitter uses untreated rayon, cotton, nylon, fiberglass, etc. as purchased, eliminating costly treating and rewinding equipment. Only 4 yarns to tend, save time and give consistent hose diameters. No drying time after knitting.

Results—a finer, more flexible hose with better adhesion, at a lower cost than braided hose.

Only Fidelity Knitters can give you all these advantages . . . advantages that put you ahead of competition and provide your customers with a better hose.

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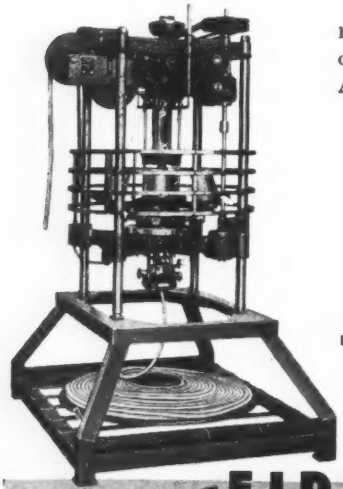

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GERMANY

Rubber Firms Report Good Business

The detailed report issued by Continental Gummi-Werke A.G., Hannover, last August for the year 1950 explains the situation of the company and at the same time highlights the political and economic factors which influenced the industry in general: the upswing in business last April; the effects of the Korean war on prices of raw materials, especially rubber; the general increase in wages and salaries granted that year; the shortage of coal; and, finally, prices of rubber manufactures; and thus in a sense sets a pattern for other company reports.

Continental started the year with considerable stocks of finished goods held over from 1949 when supply exceeded demand; but before many months had passed the situation changed radically, and total sales during 1950 increased by 35% as compared with 1949. Exports, including mainly tires and mechanical and surgical goods, soared during the year, amounting in both quantity and value to more than three times the totals of 1949; the quantity of tires shipped abroad by the company in 1950 was more than six times the total of the preceding year. The company's share of West Germany's domestic and foreign trade rose from 2.4 to 8.3% of the total, in value, and from 3% to 9.7% in quantity. The German rubber trade as a whole, the report indicates, increased by more than 30% during the year. However, it is added, because of the higher prices Germany had to pay for some raw materials and also because of import restrictions, Germany could not match the prices of British and American manufacturers on all articles.

High costs brought, as a result, higher prices for finished goods, though the rise in the latter did not keep up with that of the former. The table below shows the development of prices of raw materials and of manufactures:

Raw Materials	Jan. 1, 1950	Apr. 1, 1951
Natural rubber	100	402
Old rubber	100	333
Cotton cord	100	226
Rayon cord	100	138
Zinc white	100	210
Belting fabric	100	215
Brass	100	328
Machinery	100	125
Prices of Manufactures		
Bicycle tires	100	145
Conveyer belts	100	175
Tires for motor vehicles	100	190

The concern, which employed 13,662 persons at the end of 1950, booked gross turnover of 303,670,000 German marks in 1950, against 253,196,000 in 1949. Net profits were 7,678,490

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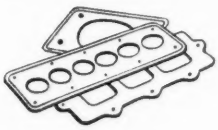
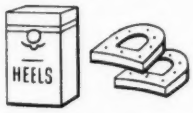
TUBULAR GOODS



GASKETS

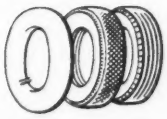
WATERPROOFINGS



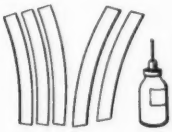
HEELS

HARD RUBBER GOODS

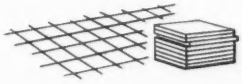
TOYS



TIRES AND TUBES



ADHESIVES



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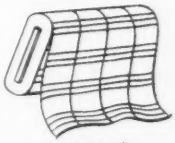
WAX COMPOUNDS

BELTING

SHOES • BOOTS

CEMENTS

JAR RINGS



TEXTILES

The applications shown above indicate some of the almost endless uses for this excellent resin.

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marks, against 6,428,490 marks; a dividend of 6% was declared, and 1,250,000 marks were carried forward.

The prospects for the current year are viewed with caution; business activity continued high through the first half of 1951, but the level of the latter part of 1950 could not be attained, first because of the stringent coal situation and next because of the decline in demand on the domestic market which began to be felt about the middle of the year.

Reports by several other German rubber companies largely repeat the main points of the Continental report.

At a general meeting Deutsche Dunlop Gummi Cie., Hanau M., presented a report covering the years 1948, 1949, and 1950, revealing that reconstruction and reequipment of the plant, extensively damaged during the war, had been largely completed, and capacity is now up to prewar level. The company was able to work at a profit in each of the three years discussed and resumed the distribution of dividends after an interval of 10 years. Profits and dividends follow: in 1948, 1,637,000 marks and 3%, respectively; 1949, 2,402,000 marks and 6%; 1950, 4,851,000 and 6%. The capital was increased to 19,000,000 marks, and the company plans to add to the lines it is now producing (tires and Semtex rubber flooring) Dunlopillo, tennis balls, automobile accessories, and some mechanicals. The total number of employes at the end of 1950 came to 2,643.

Phoenix A.G., Harburg, had to increase its personnel by 20% in 1950, thereby bringing the total number to 5,600, in order to cope with orders. Exports reportedly spiraled to 12 times the 1949 figure. A dividend of 6% was paid.

Production in 1950 by A. G. Metzeler Gummiwerke, Munich, was 11% above that of 1949, and sales on both domestic and foreign markets rose considerably. Exports were 2½ times as high as in the year before and continued their upward trend in the current year; foreign sales in the first seven months of 1951 were 20% higher than for all of 1950.

Kölnische Gummi-Faden Fabrik, vormals Ferdinand Kohlstadt & Co., Cologne-Deutz, only recently published its report for the period June, 1948-December, 1949. The firm, which specializes in rubber thread and also produces rubberized fabrics, balloon fabric, mechanicals, surgical gloves and other seamless rubber goods, closed accounts for the period with a loss of 77,525 marks. However in view of the heavy expenditures incurred in rehabilitating the war-damaged buildings and grounds, and the extensive modernization of equipment, the result is considered to be not unfavorable. In the period under review it had been possible to restore production, both as to quantity and quality, to prewar level, and also to increase exports considerably.

Price Reduction of Rubber Goods

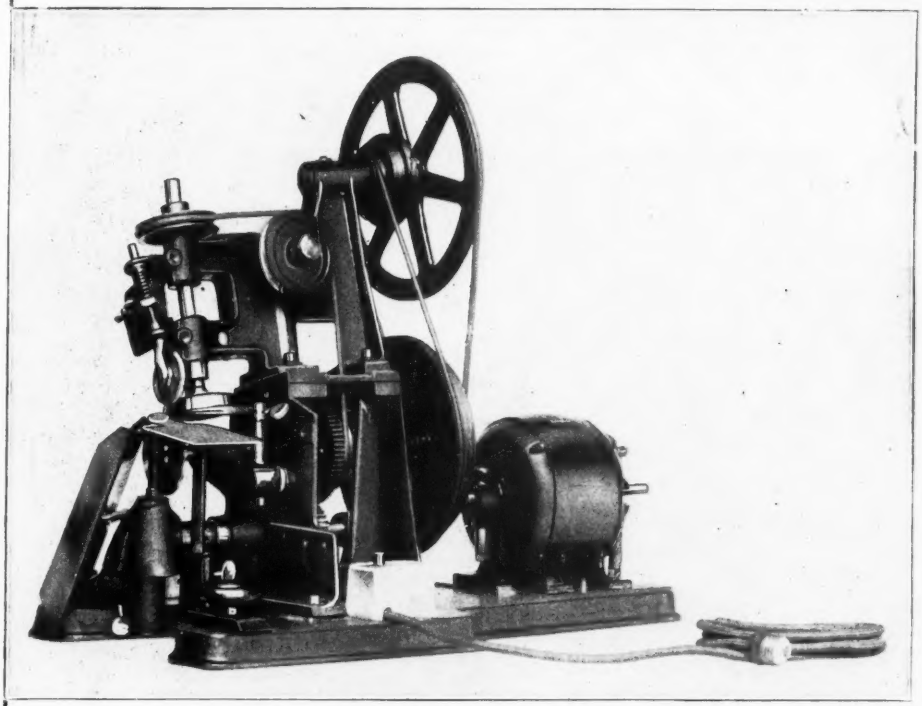
A wave of price cutting is reported in various branches of the rubber manufacturing industry of Western Germany. Tire manufacturers appear to have started the action early in July when they announced reductions averaging, at the consumer level, about 5% for cycle tires and up to about 9% for other pneumatic tires. Manufacturers of conveyer and driving belts, various types of hose, and other soft rubber mechanical goods followed suit. Before long prices of surgical goods, sponge and foam rubber goods, and finally footwear were also lowered; the reductions were approximately of the same order as for tires.

It is generally agreed that the reductions were motivated chiefly by the desire to stimulate domestic sales which had begun to slump seriously in April immediately after the relatively drastic upward revision of prices necessitated by the upswing of natural rubber. It is admitted, however, that the cuts would not have been possible if the crude rubber market had not meantime eased again, for practically all other costs continue high; coal is dearer, and so are various important chemicals; while wages also threaten to go up again.

Staudinger Honored

Earlier this year Prof. H. Staudinger, internationally known director of the Chemical Institute of the University of Freiburg, celebrated his seventieth birthday. Various German institutions took the occasion to add new honors to the many Professor Staudinger earned in the past. The University of Mainz made him an honorary doctor of natural sciences in recognition of his services in the discovery and development of ketenes and in laying the foundations of macromolecular chemistry; the Society of Cellulose & Paper Chemists & Engineers awarded him its Alexander-Mitscherlich medal for "outstanding services in the field of macromolecular compounds, especially of cellulose." Finally, the Society of the Chemical Industry of Baden made him an honorary member.

T. W. MORRIS TRIMMING MACHINES



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Hostacoll C—New Casting Resin

Farbwerke Hoechst recently put on the market a casting resin, Hostacoll C, which can be polymerized to a solid plastic by the addition, at or slightly above, room temperature, of small amounts of suitable liquid hardening agents. For this purpose three hardeners are available. The chemical composition of either the Hostacoll or the hardeners is not revealed; the latter are designated merely as P, Q, and R, respectively. The first is rapid acting, hardening 10 cubic centimeters of the monomeric Hostacoll C, in 1-2 days at 20° C in the laboratory; Q requires 2-3 weeks under the same conditions; while R, which is still slower, takes 3-4 weeks. Polymerization is exothermic; one gram of Hostacoll liberates 105 calories; hence the hardener must be carefully selected for its special purpose, and adequate cooling must be provided for to prevent local overheating.

The polymerizate yielded by the clear, slightly yellow-tinged liquid monomer is transparent and lends itself readily to such treatment as drilling, milling, and polishing. It has good resistance to a number of chemicals including benzine, cyclohexane, mineral oil, and xylol, among others; but it is rapidly destroyed by chloroform, methylene chloride, and acetic acid and is only slightly less easily attacked by nitric, hydrochloric, and sulfuric acids; resistance to ammonia, sodium hydroxide, and soda solutions, however, is much better. If it is not used under conditions of too great strain, hardened Hostacoll C retains its shape to 70° C; in storage, thermal decomposition sets in at 100° C. The electrical properties are said to be good, and because of this quality and others, including ease of use, Hostacoll is apparently already being employed as special electrical insulation material, for sealing porous castings, for making anatomical models, as cement in the optical industry, and as binder for various fillers and in laminations.

It is stressed that care is required in handling the monomeric material, the hardeners, and their mixtures, and processing must proceed under an exhaust device; nor should these materials, while in the liquid state be allowed to come in contact with the skin. Hardened Hostacoll C is claimed to be completely harmless from the physiological standpoint.

The material has impact resistance of 8-12 cm. kg/cm^2; bending strength of 900 kg/cm^2; and softening point, according to Martens, about 40° C. Impact and bending tests were carried out on normal rods.

Coal Shortage Hurts Buna Output

The shortage of coal is affecting the production of Buna, it was revealed at a meeting of Chemische Werke Huls. Professor Baumann, director of the undertaking, stated that of the 18 styrene furnaces that may be used, only 11 could be actually operated; therefore the production of Buna would probably not reach the 500 tons a month approved by the Allied High Commission.

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pound for Pound

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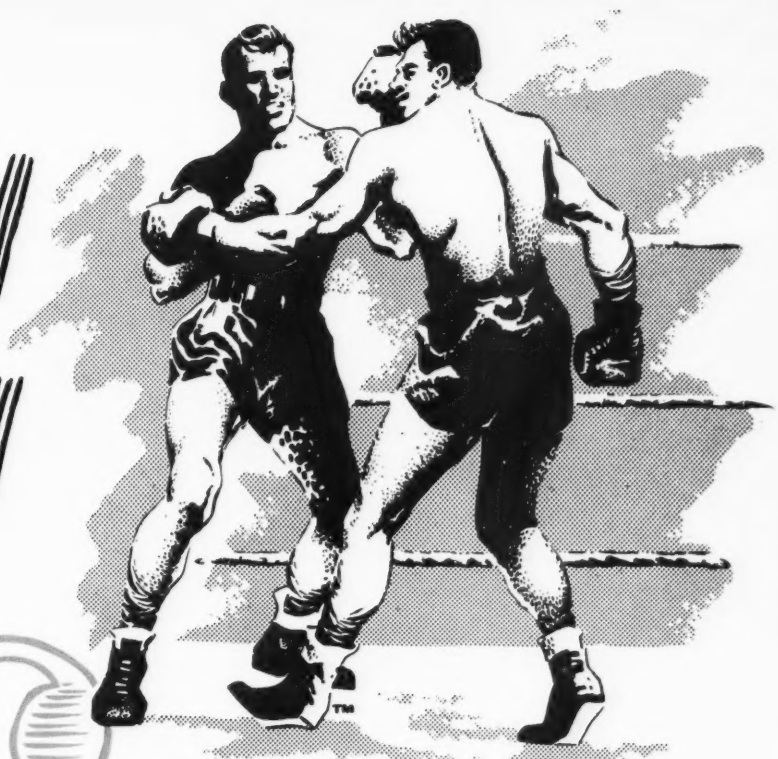

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German Rubber Society Resumes

The Deutsche Kautschuk Gesellschaft (German Rubber Society), internationally known in prewar days, is resuming its activities. At a special meeting, at Bad Neuenahr, October 11, the organization was formally reestablished, and the occasion was marked by a two-day conference. Leading rubber scientists and technologists presented papers on October 12 and 13, including, according to the provisional program issued in advance of this meeting, the following:

"Comparative Evaluation of Commercial Synthetic Rubbers," by Stocklin.

"Recent Methods of Producing Elastic Materials," Weinbrenner.

"Rubber and Rubber Substitutes in the Cable Industry," Heering.

"Primary Reactions in Rubber," Koldehoffe.

"Mastication and Reclaiming with Chemical Aids," Schneider.

"Colloid Chemical Considerations of the Processes in Vulcanization and Aging of Rubber," Behre.

"Adaptation and Limits of High-Frequency Heating in Vulcanization," Metzeler Gummiwerke.

"Contribution to the Methodology of Testing Intrinsic Strength," Ecker.

"A Method of Determining the Frictional Coefficient and Abrasion," Metzeler Gummiwerke.

"Studies in Testing Slip-Resistance of Rubber Compounds," Ecker.

"Relation between the Activity of Fillers and Vulcanization," Bottcher.

"Investigation of Active Fillers by Determining the Bound-Rubber Content," Fromandi.

"The Activity of Light-Colored Fillers," Fredenhagen.

"Dispersion of Light-Colored Reinforcing Fillers," Blankenstein.

"Determination of the Alternation Resistance of Soft-Rubber Elements in Shear and Its Relation to Energy Absorption and Shaping," Roelig.

"Chemistry of the Formation of Factice and Related Reactions," Kirchhof.

"State of Development of Calender Construction," Mohr.

Foreign Trade of the Western Zone

Western Germany's foreign trade in rubber and rubber manufactures continues to advance. Comparative figures, however, show that while the values involved far exceed those of 1937, the quantities have not yet reached prewar level, and though the value per kilogram of exports in 1950 was 4.52 marks, as compared with 2.51 marks in 1937, the total value of exports in the former year covered only 22% of the price of the raw and waste rubber imported.

In 1950 the German industry imported 106,426 metric tons of raw material including 91,874 metric tons of natural rubber, 3,163 tons synthetic rubber, and 11,334 tons of waste and old rubber, compared with 98,028 tons in 1949, including 79,828 tons of natural rubber, 2,282 tons of synthetic rubber, and 15,862 tons of waste and old rubber, and about 97,000 tons of natural rubber in 1937.

The trend of the main imports and exports of rubber manufactures in 1950 and 1949 is shown in the table which appears below:

	1950		1949	
	Imports	Exports	Imports	Exports
Tires for				
Motor vehicles ..... *no.*	82,375	214,277	83,388	21,816
Bicycles ..... *no.*	148,899	530,665	200,846	147,412
Tubes for				
Automobiles ..... *no.*	65,955	135,910	52,568	10,105
Bicycles ..... *no.*	130,143	613,017	181,876	156,690
Footwear ..... *prs.*	16,045	637,105	12,391	12,077
Mechanical hose and surgical tubing ..... *metric tons*	25	728	11	82
Belting ..... *metric tons*	15.6	387.3	44.7	70.6
Hard rubber goods ..... *metric tons*	6.6	1,446.5	7.5	638.5

The total quantity of rubber goods exported in 1950 came to 11,637.2 metric tons, against 2,102.6 tons in 1949 and 19,588 tons in 1937. The chief customers in 1950 were Switzerland, the Netherlands, France, Belgium, Denmark, United States, Turkey, Saar Territory, and Sweden, in that order.

Export business continued to increase in the first half of 1951, and many manufacturers are said to have been able not merely to equal, but to increase many times over their prewar share of the export business.

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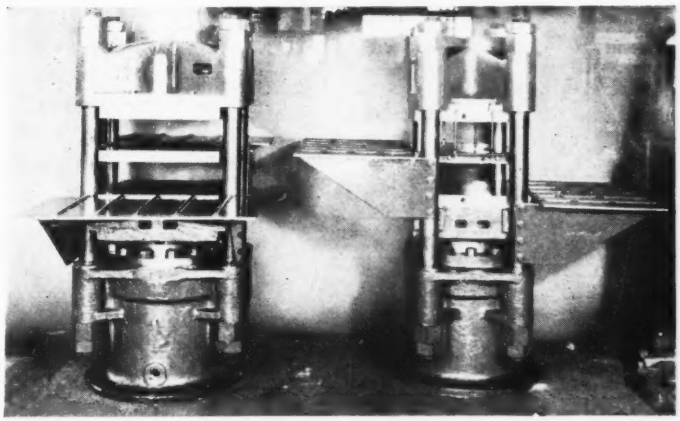

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FRANCE

Coloring Plastic Materials

Some of the problems of coloring plastic materials—specifically rubber and PVC—with the aid of organic pigments have been considered by A. Haehle.[1] The various types of toners employed for rubber come in for discussion—the purely organic and the semi-organic toners. Of the latter, the author selects the benzidine diazos, the vat dyes (indigo and indanthrene) and the phtalocyanines as excelling in fastness and insolubility, and he suggests that in the fairly near future coloring agents from these groups may replace the monoazo dyes, some of which tend to migrate because of imperfect insolubility, and also the less fast sulfonic and carboxylic salts. The phtalocyanines, he stresses, are of particular interest since they surpass all the other rubber pigments in insolubility, fastness, and brilliance of tint. The phospho-tungsto-molybdates with organic base, he adds, are as yet little known in Europe.

Turning to PVC, Haehle points out that since this material is naturally colorless, it should be easy to dye; yet only a few of the organic pigments used in rubber have been found suitable for use with it.

The chief difficulties met with in using organic pigments in PVC arise from the fact that the action of heat or of light and weather decomposes the PVC to olefinic carbide and hydrochloric acid, and the latter destroys a great many dyes. Another difficulty—the tendency of colors to migrate—is due to the solubility of the pigments in the solvents used as plasticizers for the PVC. These adverse effects are especially marked in unstabilized PVC; of 27 organic pigments used with rubber and tested also on PVC, 18 had to be rejected because of color migration and color changes during gelification. Of the remaining nine, only three survived a test of resistance to light and weather running for six months, when incorporated in unstabilized PVC. These pigments were solid yellow Vulcafixe JR, solid SD blue Vuleafixe, and a copper phtalocyanine blue (Heliogene B). Not one red pigment survived the test, although it is pointed out that Ruby Vulcafor B came out very well in the fadometer test and underwent no change during the first two or three months of the light and weather test so that it could be used where requirements are less rigid.

[1] *Rev. gén. caoutchouc*, 28, 9, 633 (1951).

Plastics Imports and Consumption

Official statistics indicate that France imported 7,394 tons of plastics materials in 1950, of which the most important were polystyrene (2,873 tons), semi-manufactures of cellulose acetate (1,032 tons), cellulose acetate molding materials (564), aminoplasts (355), phenoplasts (274), PVC (688), methacrylate (226) polythene (182), also condensation products of polyalcohols (476) and cumarone (214 tons).

According to a special issue of the Italian plastics journal, *Materie Plastiche*, consumption of plastics (in tons) by France and four other countries during 1938, 1948, and 1950 was:

	1938	1948	1950
Italy	7,500	8,500	13,000
France	10,255	23,000	26,000
Germany	45,000	*45,000	*50,000
England	8,500	67,500	140,000
United States	90,000	600,000	750,000

*West Germany only.

AUSTRIA

After the period of public administration, lasting six years, had been ended for Semperit Oesterreichische-Amerikanische Gummiwerke A.G., an extraordinary general meeting was called, and a board of directors was elected, with Joseph Joham as president. In the past six years the chief factories at Traiskirchen and Wimpassing, which had suffered serious damage in postwar incidents, were rehabilitated. The company supplied the home market with a large-variety of rubber products including tires of all kinds, footwear, hose and belting, toys surgical goods, foam rubber, asbestos and plastic goods. Such progress has been made that annual output is now almost three times that of prewar, and the company employs 6,500 persons; moreover, it has successfully reentered the export field.

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GREAT BRITAIN

B.R.P.R.A. Research Report

In the summary of the 1950 Report of the Director of Research of the British Rubber Producers' Research Association recently received, the work carried out during the year is briefly reviewed. Special attention was given to an investigation of the possibilities of vulcanization with the aid of an organic peroxide to replace sulfur and the usual accelerators, a method which might perhaps have a favorable effect on aging qualities. Meanwhile intensive studies of the chemical reactions responsible for physical deterioration of rubber are stated to have yielded some good results, at least with regard to protection against light oxidation, and it is expected that a new type of agent for this purpose will soon become available.

Research on latex was concerned chiefly with the problem of stability, and a new group of heat-sensitizing agents of graded properties could be developed in collaboration with a chemical manufacturer. Other work on latex stability involved intimate mixtures of rubber and resins, from dispersions; and a simple method of blending cyclized rubber in latex form with rubber (as latex) is being tested. The latter mixture is said to vulcanize readily and, in collaboration with the British Boot, Shoe & Allied Trades Research Association, the products are being tried out as shoe soling material.

Other types of resin, either mixed or chemically combined with rubber, are also being studied. Materials of both types have been found to vulcanize readily, and final products of widely varying degrees of hardness have been obtained. Those with a hardness comparable to that of a normal tire tread are naturally of special interest; so far they seem to offer some advantages over the latter, especially in their behaviour under vibrating loads, but much work is needed before their sphere of usefulness can be defined.

New tests have thrown much light on the factors determining abrasion and the way it occurs; very much simplified forms of abrasion have been tested, as scratching different types of rubber with a pin and digging into rubber with a tapered screw. Results have led to the conclusion that the hardness of the tread compound is important only because it limits the movement of the tire on the road; the actual wearing surface is softened by the "working" to which it is subjected. This point was con-'firmed by an experiment which revealed that a plug of unfilled rubber inserted into a tire shows no tendency to wear faster than the surrounding tread.

With regard to tear resistance, a quantity expressing the tendency of a rubber to cut growth could be defined; the quantity is characteristic of the rubber and is independent of the shape of the specimen or the type and position of the cut. Thus it becomes possible to relate the results of different tear tests and also to assess their efficiency in determining tendency to cut growth.

The new unit, Rubber Technical Developments, jointly established by the B.R.P.R.A. and the British Rubber Development Board to develop new applications to the point where they can be exploited commercially, is now after many delays and initial difficulties operating efficiently.

Roads Rough?
SEE PAGE 134

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DENMARK

On the occasion of an international meeting of road experts, held in Odense on August 23, preparations were started on a rubber-covered road in Odense, the first in Scandinavia. It is planned to cover 10,000 square meters with black or grey rubber asphalt; crossings for pedestrians are to be white. The new cover is obtainable in all colors.

ITALY

The eventual large-scale expansion of the production of synthetic chemicals will be made possible by the establishment by the important Montecatini concern of a plant for the production of olefins. The purchase of the necessary machinery, to cost $2,762,000, will reportedly be financed by an ECA grant.

FAR EAST

MALAYA

Rubber Statistics

In 1950 gross exports of rubber from Malaya totaled 1,106,500 tons, valued at $2,444,921,325 (Straits currency), against 899,212 tons, value $726,896,296, in 1949, official statistics indicate. Of these amounts, Malayan production accounted for 657,845 tons, value $1,832,307,198 in 1950, against 679,071 tons, value $603,278,664, the year before.

There were 2,309 rubber estates with a planted area of 1,976,810 acres, as compared with 2,318 estates and an acreage of 1,982,627 in 1949. The number of European estates was reduced by 32 in 1950; on the whole these seem to have been small and were apparently acquired by Chinese. Of the total acreage, European planting accounted for about 75%, Chinese around 20%, and Indians 5%.

Latest export figures indicate that the high totals of 1950 are to be surpassed by those for the current year. Up to September 1, 1951, 806,474 tons had been shipped from Malaya; at this rate an additional 400,000 tons may be expected for the remaining period to December 31.

Meantime Malayan production figures for the first eight

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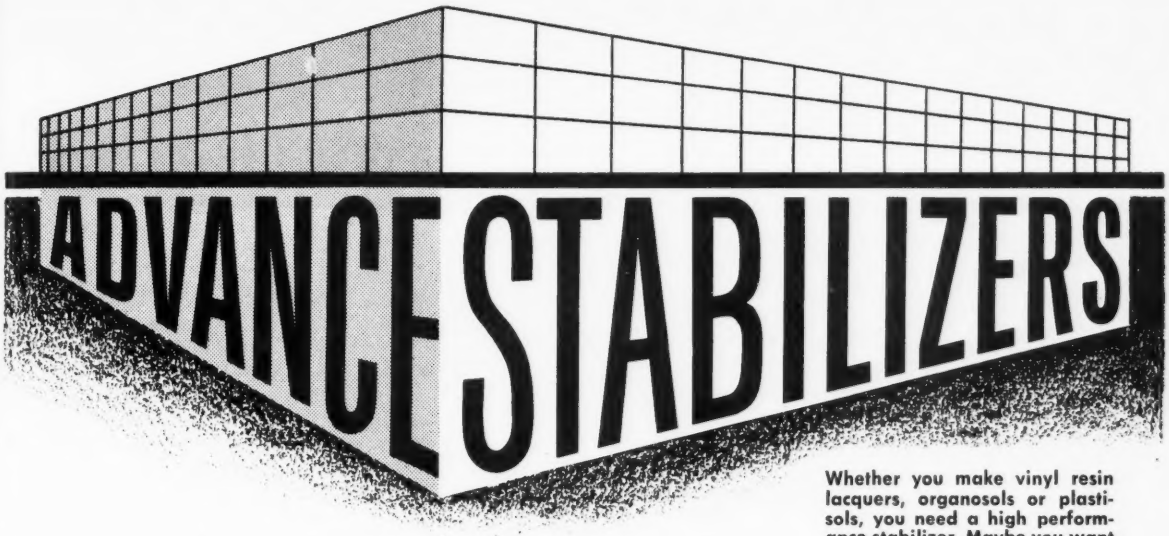

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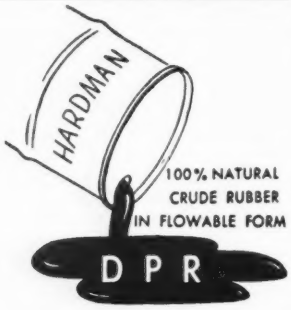

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months of the year show a drop, as compared with those for the corresponding period last year, that is, from 445,539 to 409,573 tons.

Recently published data on remilled rubber in Malaya show a decline of more than 40% in the output of remilled rubber in the first seven months, as compared with the same period of 1950, that is, from 250,778 tons to 143,201 tons.

At the same time there was a correstponding decrease in the imports of slab rubber from Indonesia, following diminished demand for remilled blanket by the United States.

Sales of Rubber Estates

Sales of rubber companies have figured rather conspicuously in the news this year, especially in recent months. Transactions have apparently been spurred as much by fear of terrorism as by the desire to cash in on the present boom; in some cases, at least, the boom has merely offered potential sellers an opportunity of ridding themselves on favorable terms of properties they planned to dispose of in any case because of banditry.

Some of the larger companies recently sold remote or scattered divisions, including two outlying estates of Pataling Rubber Estates, Ltd., and one each belonging to Sungei Salak Rubber Co., Sungai Tamu Rubber Co., Ltd., and Takau Rubber Plantations. In each case it is mentioned that the estates in question are distant from other sections, and in some it is added that terrorism had increased in the areas concerned. From other details given it appears that most of these plantations are in or near the state of Negri Sembilan, suggesting a high degree of bandit activity here. The two estates recently offered for sale by Dunlop Malayan Estates, Ltd., are also in this area. These holdings are: Legong Ulu Estate, covering 2,365 acres, of which 2,194 acres are planted and include 1,215 acres of clonal budded rubber; and Bukit Bertem Estate, covering 1,829 acres, including 1,584 acres of mature seed rubber.

In addition several small European estates have been bought up at very good prices, chiefly by Chinese speculators.

Local Rubber Notes

More than 1,000 tons of rubber were lost in a fire at the remilling factory of Joo Sing Rubber Works, Singapore, at the end of September. Police are investigating for arson.

The Member for Home Affairs, Dato Onn bin Ja'afar has lately organized a new party, which is attempting to bring together into one political organization members of the different communities of the country. The object of the party is, as its name, Independence of Malaya Party (IMP) indicates, independence for Malaya; it desires the "well-being and advancement of the people, based on principles of equality of opportunity and of political, social and economic rights and obligations." It is attempting to reach particularly the workers of Malaya. At a recent conference a number of delegates of the strong Plantation Workers' Union of South Malaya, with membership of about 25,000, signed forms indicating their support of the new party. In this they acted as individuals, but it is expected that their example will be followed by many of the members of this union.

CEYLON

The Polish ship, *Mickiewicz,* which arrived at Colombo on September 10 to take on a cargo of rubber for China, left October 3 for Chinese ports with 5,535 tons of rubber. Well-informed circles in Colombo say the Chinese offered between 10 pence and one shilling per pound over prevailing market prices. This is the first direct shipment of rubber to China since the sale of strategic materials to that country was banned. Last August, 2,500 tons of rubber were to have been shipped by the Polish vessel, *Kilinski,* which had been specially chartered for the purpose by local shippers, but nothing came of this plan. Subsequently other attempts were made, but they all shattered against the refusal of oil companies at Bombay to supply the necessary fuel.

According to data issued by the Rubber Statistical Bulletin, total outputs of rubber in Ceylon during the first half of 1951 came to 48,500 tons, including 39,000 tons of estate rubber and 9,500 tons from smallholdings. Output for all of 1950 had been 113,500 tons.

Exports of crude rubber in the 1951 period came to 52,206

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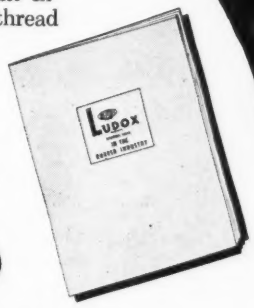

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tons, against 118,525 tons for all of 1950. The United States headed the list of buyers, with a total of 13,382 tons in the 1951 period; the United Kingdom followed with 12,647 tons. Other important customers were Italy (5,303 tons), Netherlands (2,516 tons), and Germany (6,805 tons).

A new sliding scale of duties on rubber exports came into effect on September 1, based on weekly average f.o.b. value per pund of rubber at Colombo; this takes the place of the former flat rate of 50 rupee cents per pound.

INDO-CHINA

An attempt is to be made to interest the proper authorities in the installation of equipment at debarkation points, to permit the bulk shipment of latex from Indo-China.

AFRICA

The government of the Union of South Africa has included tires among the exports now under control, and in future tire manufacturers will be permitted to export only by permit. Permits, however, will be granted for six months instead of for individual export batches. Rubber companies here are wondering how the new restrictions will affect their ability to handle a large Danish order for up to 40,000 tires and tubes a year, which a Danish importer was preparing to give shortly after control was announced.

The scarcity of rubber has forced the authorities to postpone indefinitely the laying of a 40-yard experimental strip of rubber road in Cape Town.

The local Dunlop Rubber, Ltd., branch reports record profits for 1950, when net earnings totaled £340,453 against £202,002 in 1949. Preference dividends at 6% and ordinary dividends at 12% were on the same level as in 1949. The company is building new sales depots at Durban and Port Elizabeth and will erect a similar depot at Cape Town in the near future.

The General Tire & Rubber Co. (South Africa), Ltd., reports that 1950 was the first period during which it operated as a producing unit for the full 12 months. Despite serious difficulties, financial results were satisfactory; the two preference dividends were paid, and a first ordinary dividend of 7½% is also to be turned out. Referring to tire prices, the chairman of the company stated in his annual report that the present retail prices of South African tires were said to be about 30% lower than those in the United States.

The plant of Goodyear Tire & Rubber Co. (South Africa), Ltd., built at Uitenhage in 1947, recently produced its millionth tire.

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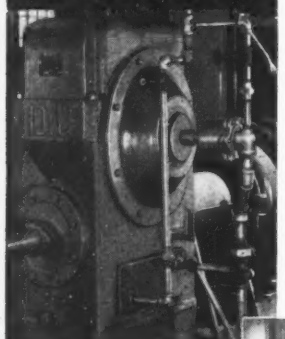

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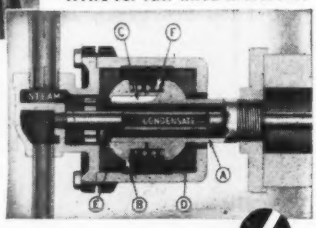

Johnson Joint installed on rubber extruder. Photo courtesy of Manhattan Rubber Div., Raybestos-Manhattan, Inc.

Rotating member consists of Nipple (A) and Collar (B), keyed together (C). Seal ring (D) and bearing ring (E) are of self-lubricating carbon graphite. Spring (F) is for initial seating only; joint is pressure sealed in operation.

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Editor's Book Table

BOOK REVIEW

"Plant Engineering Handbook." William Staniar, Editor-in-Chief. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18, N. Y. Cloth, 6 by 9 inches, 2,022 pages. Price, $15.

The principles and essentials of good practice in the organization, design, construction, operation, and maintenance of a modern industrial plant are given in detail in this new handbook. Designed to aid in the understanding of the basic problems and the best current methods of operating a modern plant, the 35 sections of the book cover 76 major areas of plant operation and maintenance. Written by 87 authorities from the academic and industrial fields, this book will serve as a constant source of reference on all subjects relating to plant engineering. Further value is gained by the use of 544 data tables and the inclusion of 1,406 illustrations, charts, and graphs.

The 35 sections cover basic industrial costs and cost reduction; management engineering; foundations; materials of construction; fire prevention; plant maintenance; water purification; power plants; refrigeration; instrumentation and control; piping; welding; power distribution and lighting; mechanical power transmission; bearings; electrical speed controls; hydraulic power systems; lubrication; mechanical packings; materials handling; air conditioning; pneumatic conveying and dust control; crushing and grinding; drying; metallurgy and corrosion; waste disposal; heat transfer; plant physics; graphical mathematics; vibration control; containers and packaging; glass; plastics; and patents and copyrights.

Of particular interest to the rubber and the plastics industries are the following: "Natural and Synthetic Rubber," E. R. Gilliland; "Rubber-Lined Pipe and Process Equipment," O. S. True; "Mechanical Packings," F. C. Thorn and J. R. Boyer; "Conveyer and Conveyer Belt Engineering," C. W. Staacke; "Power Belting, Fasteners, Pulleys and Shafting," W. Staniar; "Steel Cable Transmission Belting," Paul Suloff; "Multiple and Variable Speed V-Belt Drives," H. A. Wilson; and "Plastics," G. K. Scribner.

NEW PUBLICATIONS

"Pittsburgh Chemicals." Pittsburgh Coke & Chemical Co., Grant Bldg., Pittsburgh 19, Pa. 12 pages. This bulletin summarizes the principal products of five of the company's divisions, covering coal chemicals, plasticizers, activated carbons, protective coatings, and agricultural chemicals. Descriptions of the various products include properties and applications.

"Electronic Tubes for All Industrial Applications." Milo Radio & Electronics Corp., 200 Greenwich St., New York 7, N. Y. 28 pages. Designed for industrial use, this booklet gives specifications and technical data on hundreds of special-purpose electronic tubes used in such industrial applications as processing, control, production, testing, weighing, measuring, etc.

"Meletron Pressure & Vacuum Actuated Switches for Industrial Applications." Catalog 1MB-1. Barksdale Valves, 1566 E. Slauson Ave., Los Angeles 11, Calif. 36 pages. This catalog describes and illustrates the different styles of pressure actuated switches available, including diaphragm, bourdon tube, and piston types. Operating characteristics are given, together with diagrams for circuit detailing, an electrical rating table, and other application data.

"Specifications for Government Synthetic Rubbers." Revisions dated August 1, 1951. Office of Rubber Reserve, RFC, 811 Vermont Ave., Washington 25, D. C. 13 pages. These revisions include changes in he specifications or GR-S-20, GR-S-26, GR-S-60, GR-S-Black-4, and GR-I-15; revisions in Sections C-3 (Determination of Fatty Acid and Soap) and D-5-c (Determination of properties of Vulcanizate, Recipe and Mixing Procedure For); and a revised table of contents to include these changes.

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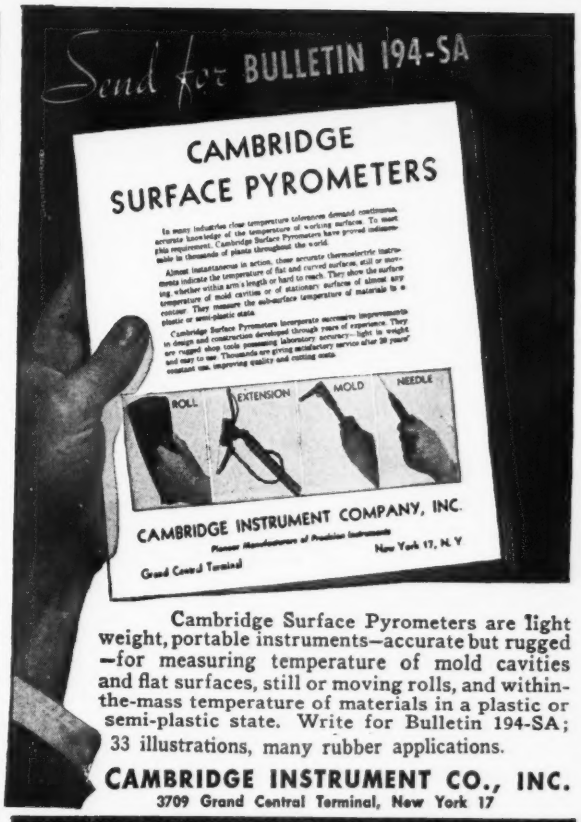

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"Silicone Rubber O-Rings." Technical Data Sheet No. 102. Frederick S. Bacon Laboratories, Watertown 72, Mass. 1 page. Dimensional data are given for the company's silicone rubber O-rings made in both regular and special sizes, together with physical and chemicals properties of the four silicone rubber stocks used in molding the rings.

BIBLIOGRAPHY

Effect of Mold Fungi on the Chemical Composition of *Kok-saghyz* Roots during Their Transportation and Storage. S. M. Mashtakov, *Izvest. Akad. Nauk Beloruss. S.S.S.R.*, 2, 85 (1949).

Elongation Hysteresis of *Hevea* and Synthetic Elastomers. M. Mooney, S. A. Black, *Can. J. Research*, 28F, 83 (1950).

Reinforcing Effect of White Soot GIPKha in Native Natural and Synthetic Rubbers. I. S. Okhrimenko, A. A. Antonova, *Trudy Leningrad. Tekhnol. Inst. im. Lenin*grad. Soveta, 184 (1946).

VDI Directions for the Formation and Application of Rubber Parts. *J. Rubber Research*, 19, 29 (1950).

Measurements of Mechanical Properties of Polyisobutylene at Audiofrequencies by a Twin Transducer. R. S. Marvin, E. R. Fitzgerald, J. D. Ferry, *J. Applied Phys.*, 21, 197 (1950).

Polyvinylacetate Resins. I. Sakurada, *J. Soc. Org. Synthetic Chem. (Japan)*, 7, 130 (1949).

Strength-Variance Studies of Plastics. W. J. Gailus, S. Yurenka, A. G. H. Dietz, *Trans. Am. Soc. Mech. Engrs.*, 72, 299 (1950).

Some New Industrial Applications of X-Rays in the Control of Phenolics, Thermoplastics, and Rubber. J. Gauthier, *Ind. chim. belge*, 14, 205 (1949).

Chemical Resistance of Thermoplastic Artificial Materials. W. Krannich, *Werkstoffe u. Korrosion*, 1, 12 (1950).

Multilinked Polyamides. J. R. Schaefgen, P. J. Flory, *J. Am. Chem. Soc.*, 72, 689 (1950).

Molecular Structure and Solubility of Polyvinyl Acetate, Polyvinyl Alcohol, and Reacetylated Polyvinyl Alcohol. A. Dupré, *Brit. Plastics*, 22, 249, 89a (1950).

Mechanical Behavior of Viscoelastic Substances. R. Slips, *J. Polymer Sci.*, 5, 69 (1950).

Desorption of Unreacted Isoprene from Synthetic Rubber Latex. O. E. Dwyer, J. A. Baumann, *Ind. Eng. Chem.*, June, 1950, p. 1230. O. E. Dwyer, L. T. Burke *Ibid.*, p. 1240.

Play Ball. (Balls and Toys Made by Fli-Back Co.) *Esso Oilways*, June, 1950, p. 16.

How Ohio Rubber Achieved Centralized Control for Its Materials Handling System. A. L. Masters, *Rubber Age (N. Y.)*, June, 1950, p. 314.

Compounding of Neoprene with Fine-Particle Silica. R. F. Wolf, F. W. Gage, *Rubber Age (N. Y.)*, June, 1950, p. 317.

Prepartion, Properties, Uses of Cellulosic and Rubber Vehicles. R. F. Wint, *Paint, Oil, Chem. Rev.*, July 6, 1950, p. 12.

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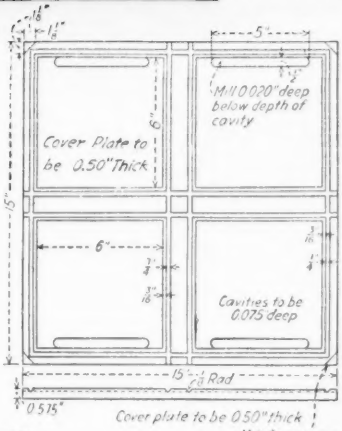
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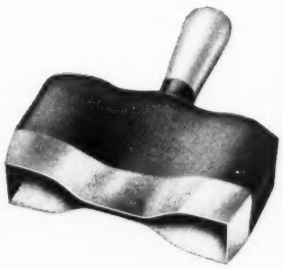

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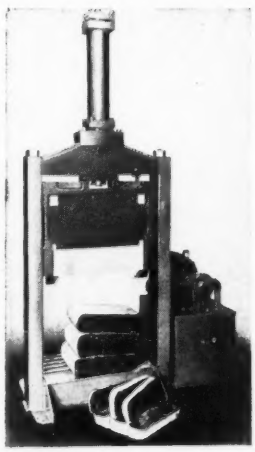

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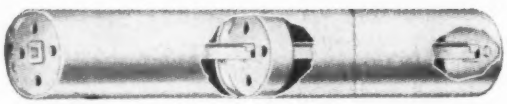
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Identification and Determination of o-Tricresylphosphate or o-Cresol in Technical Tricresylphosphate and Goods of Softened Plastics. B. Wurzschmitt, *Kunststoffe*, 39, 9, 219 (1949).

Determination of Molecule Size in High Polymer Compounds through Viscosity Measurements—a Survey. W. Scheele, T. Timm, *Kautschuk u. Gummi*, 2, 8, 247; 9, 281 (1949).

Polish Rubber Industry. S. Blicharz, A. Olaszek, *Prezemysl Chem.*, 28, 218 (1949).

Manicoba and Mangabeira Rubbers. R. W. Schery, *Econ. Botany*, 3, 240 (1949).

Refractive Index of Natural Rubber for Different Wave Lengths. L. A. Wood, L. W. Tilton, *J. Research Natl. Bur. Standards*, 43, 57 (1949).

Physical Aspects of the Elasticity of Rubber. I. J. Clouaire, *Rev. gén. caoutchouc*, 26, 626 (1949).

The Mullins Effect. Has It a Bearing on Reinforcement? R. G. Newton, *India Rubber J.*, 117, 354 (1949).

Cold Rubber Baton Rouge Plant of 60-Million-Pound Annual Capacity Polymerizes Butadiene and Styrene at 41° F. to Produce New Top-Quality Product. L. S. McCaslin, Jr., *Oil Gas J.*, 48, 8, 60 (1949).

Determination of Iron, Copper, Lead, and Mercury in Fabricated Polyvinyl Chloride. W. T. Rees, *Analyst*, 75, 160 (1950).

Discussion of Thermoplastic Insulations for Wire and Cable Applications. J. E. Flood, *Wire & Wire Products*, 25, 401 (1950).

German Chewing Gum. E. Benk, *Seifen-Öle-Fette-Wachse*, 76, 105 (1950).

Postwar Review of USF Rubber. J. McGavack, O. W Lundstedt, *Rubber Age (N. Y.)*, July, 1950, p. 431.

Electric Power Distribution Systems for Small Rubber and Plastics Plants. B. D. Morgan, H. J. Finison, *Rubber Age (N. Y.)*, July, 1950, p. 437.

A Call for More Reserves. Assets of Many Rubber Companies Are Considerably Inflated and Require Review to Keep Businesses in Working Condition. A. Roberts, *Rubber Age (N. Y.)*, July, 1950, p. 443.

Improvement of Dispersion of Benzothiazyl Disulfide in GR-S and Natural Rubber by Use of Fusion Mixtures with Sulfur. M. C. Throdahl, *Rubber Age (N. Y.)*, July, 1950, p 445.

Variability of Elastomers. W. S. Penn, *India Rubber J.* July 22, 1950, p. 4.

Effect of Oxygen on Polymerization Systems at 41° F. R. W. Hobson, J. D. D'Ianni, *Ind. Eng. Chem.*, Aug., 1950, p. 1572.

Cold Compression Set of Elastomer Vulcanizates. R. E. Morris, J. W. Hollister, A. E. Barrett, *Ind. Eng. Chem.*, Aug., 1950, p. 1581.

Light-Scattering Apparatus and Techniques for Measuring Molecular Weights of High Polymers. H. J. Hadow, H. Sheffer, J. C. Hyde, *Can. J. Research*, 27B, 791 (1949).

Bonding Plexiglas. H. Paukert, *Kunststoffe*, 39, 341 (1950).

Determination of Feeble Scatter Intensities in Plastic Foils. K. Hoffman, *Kunststoffe*, 39, 11, 345 (1950).

Possibility of Improving the Yield of *Hevea brasiliensis* by Oligo-Elements. P. Compagnon, P. Tixier, *Rev. gén. caoutchouc*, 27, 9, 525 (1950); 10, 591; 11, 663.

Latex Thread. A. Vial, *Rev. gén. caoutchouc*, 27, 10, 594 (1950).

Contributions to the Study of Some Physico-Chemical Properties of Solutions of Chlorinated Rubber. M. Riou, R. Pibarot, *Rev. gén. caoutchouc*, 27, 10, 596 (1950).

On the Inhibition of the Oxidation of Vulcanized Rubber in the Presence of Copper Compounds. G. J. van der Bie, *Rev. gén. caoutchouc*, 27, 11, 655 (1950).

Rubber Poisons and Antioxygens. G. Salomon, *Rev. gén. caoutchouc*, 27, 11, 659 (1950).

Sulfonation of Natural Rubber. G. J. Van Amerongen, *Rev. gén. caoutchouc*, 27, 12, 731 (1950).

The Constituents of *Hevea* Latex. VII. K. C. Roberts, *J. Rubber Research Inst. (Malaya)*, Aug., 1950, p. 278.

Determination of the Molecular Weights of Polymers Formed at Different Stages of Polymerization. E. V. Kuvshinskiĭ, E. V. Melekhina, *Zhur. Fiz. Khim*, 24, 199 (1950).

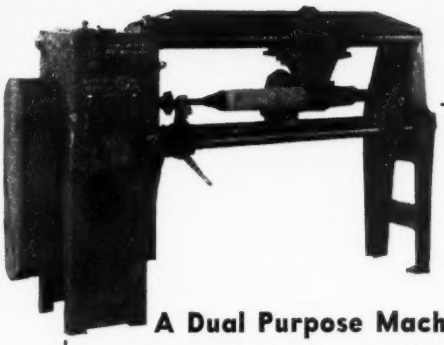
Effect of Chain Branching on the Osmotic Pressure of Solutions of High Polymers. E. Kunst, M. Magat, *Compt. rend.*, 227, 902 (1948).

Light-Scattering Measurement of Interactions between Unlike Polymers. W. H. Stockmayer, H. E. Stanley, *J. Chem. Phys.*, 18, 153 (1950).

Polymerization Products. J. W. C. Crawford, *Ann. Repts. Soc. Chem. Ind. Progress Applied Chem.*, 33, 338 (1948).

Concentration of Benzene Vapors in the Atmosphere of Rubber Works. A. Capellini, P. Cirla, *Med. lavoro*, 40, 269 (1949).

Benzene Poisoning. A Survey of the Literature. *J. Rubber Research*, 19, 55 (1950).



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Vulcanization by m-Nitrobenzene. IV. S. Minatoya, K. Sugino, *J. Soc. Rubber Ind. (Japan)*, 16, 685 (1943). **V.** *Ibid.*, 17, 240 (1944).

A Study of Workers Exposed to Talc and Other Dusting Compounds in the Rubber Industry. W. L. Hogue, Jr., F. S. Mallette, *J. Ind. Hyg. Toxicol.*, 31, 359 (1949).

Formation of High-Polymer Vinyl Compounds. L. Kuchler, *Naturwissenschaften*, 35, 105, 144 (1948).

Manufacture and Application of Synthetic Adhesives. K. Werner, *Kunststoffe*, 39, 283 (1949).

Extrusion of Hardenable Synthetic Resin Molding Compounds. K. Brandenburger, *Kunststoffe*, 39, 8, 189 (1949).

Sewing and Welding of Softened PVC Sheets. H. Beck, *Kunststoffe*, 39, 9, 205 (1949).

Elastic Dispersion of Plastics and Plastic Compounds. II. F. H. Muller, *Kunststoffe*, 39, 9, 215 (1949).

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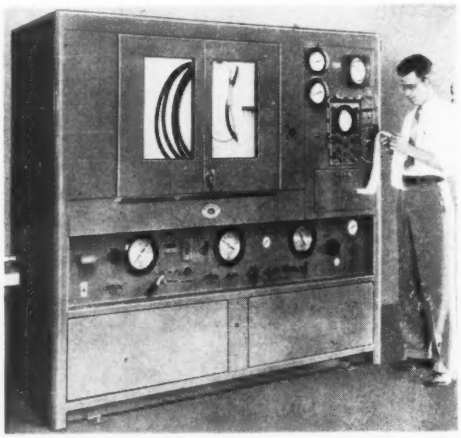

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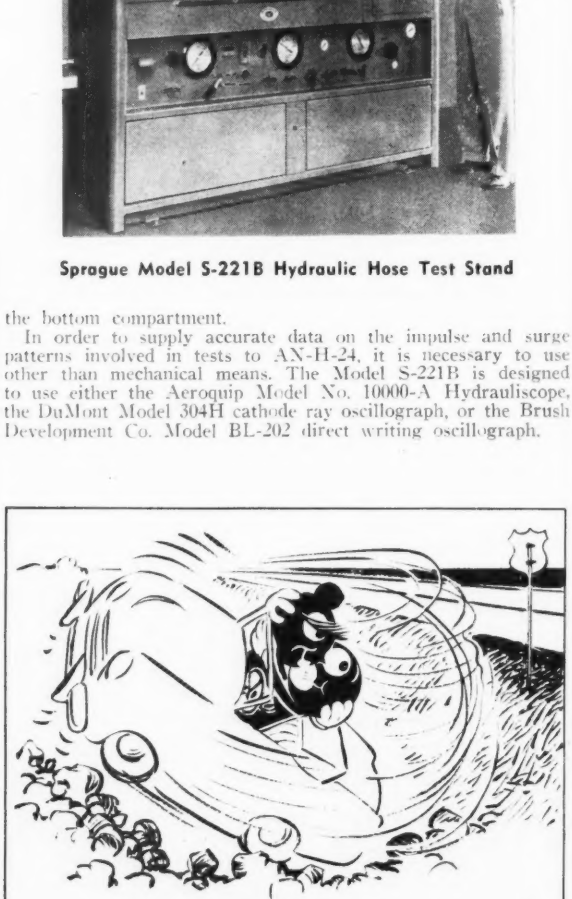

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FAN BELT FOREMAN: MUST BE FULLY EXPERIENCED IN automotive and F. H. P. belts. Plant located in Eastern Pennsylvania. State age, experience, and salary expected in first letter. Address Box No. 903, care of INDIA RUBBER WORLD.

SPONGE RUBBER EXPERT: MUST HAVE FULL EXPERIENCE, molding automotive sponge. Able to organize and operate department. Excellent opportunity. Plant located Eastern Pennsylvania. State age, detailed experience, marital status, and salary requirement in first letter. Address Box No. 904, care of INDIA RUBBER WORLD.

CHEMICAL ENGINEER—REQUIRE EXPERIENCED MAN FOR rubber floor tile operation in new plant not yet manufacturing this product. Salary open. Outline experience and qualifications in detail. All replies confidential. Address Box No. 905, care of INDIA RUBBER WORLD.

INDUSTRIAL ADHESIVE TECHNOLOGIST

Man to work in development laboratory in Indiana, which has a fast expanding adhesives department. Must have a good record of experience in industrial adhesives with strong background in organic chemistry. Prefer Ph.D. or some advanced work, but good experience may be substituted. Write giving personal résumé with salary desired. Address Box No. 906, care of INDIA RUBBER WORLD.

WANTED: ENGINEER FOR MECHANICAL METHODS AND production-seasoned small Midwest rubber plant. Must have good education, experience, and record. Opportunity. Address Box No. 907, care of INDIA RUBBER WORLD.

RUBBER TECHNOLOGIST—FOR COMPOUND AND PRODUCT development work. Minimum of 3 years' laboratory and factory experience desired. Permanent position with long-established firm located 30 miles from New York City. Address Box No. 908, care of INDIA RUBBER WORLD.

SITUATIONS OPEN (Continued)

SPONGE RUBBER CHEMIST—EXCELLENT OPPORTUNITY for man with experience and ambition. Permanent position with established firm located in Pennsylvania. Salary open. Submit detailed résumé of business experience and personal qualifications first letter. Address Box No. 909, care of INDIA RUBBER WORLD.

EXPERIENCED PLASTIC ENGINEER, CHEMIST, OR SUPERINtendent for thermosetting compression molding plant, now running on clutch facings and brake lining. Friction material experience absolutely necessary. In replying state age, experience, family status and salary expected. Mail snapshot. Apply by mail: STANDCO BRAKE LINING CO., P. O. Box 92, Houston 1, Texas.

WANTED: CHIEF MECHANICAL ENGINEER FOR HEAVY mechanical rubber goods plant. Man must have steam-power plant, general maintenance, and construction experience. Address Box No. 910, care of INDIA RUBBER WORLD.

CHEMIST FOR PLANT EMPLOYING 150 PEOPLE ON MOLDED, extruded, and lathe-cut goods. Applicant should have experience both in production and laboratory. Apply MARTIN RUBBER CO., INC., Long Branch, New Jersey.

CHEMISTS

A leading manufacturer in the adhesive and coating field has several openings in its research laboratories for both experienced men and recent graduates.

EXPERIENCED men must have an excellent and proven background in the field of rubber, resin, or high polymer chemistry.

INEXPERIENCED men must be honor students or graduated from the upper 10% of their class.

Salaries are excellent and will be judged on the individual's background. Located in New York City. Box 418, 1474 B'way, New York 18, N. Y.

WELL ESTABLISHED SMALL PLANT IN NORTHERN Indiana, engaged in molding of industrial parts from rubber and plastic, desires the services of a technician as a hard working partner in charge of production. Interested party could make a capital investment or purchase an interest on time. Opportunity for someone to enter business with ambitious and responsible persons. Address Box No. 915, care of INDIA RUBBER WORLD, giving qualifications and experience.

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(*Classified Advertisements Continued on Page 253*)

MARKET REVIEWS

CRUDE RUBBER

STOCKPILE purchasing of natural rubber by GSA in the foreign markets was almost non-existent during the period from September 16 to October 15. Market prices were anywhere from 4-6¢ a pound above government buying ideas, but early in October some offerings on the lower grades of rubber were made at prices in line with GSA levels. While GSA is willing to pay in the middle fifties for Siamese rubber, in compliance with a trade agreement guaranteeing a specific tonnage over the year, its price for the other markets is reported to be 48¢ a pound.

On September 25, GSA announced that the 52¢-a-pound selling price for natural rubber (No. 1 smoked sheets) to domestic manufacturers would be retained through October. Prices for the lower grades were also unchanged, except for flat bark, which was raised to 34¢ a pound. Reconditioned flat bark was held at the old price of 29¢ a pound. As of October 15, prices for November had not been announced, but it was believed that no changes would be made.

The prices for GR-S and butyl continued unchanged during the period at 26¢ and 20.75¢ a pound, respectively.

Latices

IN VIEW of the current oversupply of *Hevea* latex and the fact that stockpile objectives were achieved in March, further decontrol of this commodity by the government, in the form of discontinuing sole buying and importing by GSA, is believed imminent. When decontrol is announced, the principal problem will be the liquidation of government stocks without loss or profit, according to Arthur Nolan, Latex & Rubber, Inc., writing in the October issue of *Natural Rubber News*. It is considered likely that no "free" latex will be permitted to be sold until such time as the GSA stocks have been sold out. This policy may require GSA deliveries to continue through December, but purchase commitments can probably be completed during October.

At the same time GSA can permit latex to be shipped for arrival and distribution after the complete exhaustion of government stocks. This practice would avoid any shortage of latex during the "in transit" period required for shipments from the Far East. Latex producers in Malaya, Sumatra, and Indo-China are thought to have moderately heavy stocks and can ship promptly. Producers can then use this period to resume regular production, since most latex producers are now either completely shut down or making only token quantities of concentrated latex.

The GSA selling price for concentrated *Hevea* latex in rail tank-car lots of 64¢ per dry pound continued during October. Any price change for November is considered problematical in view of possible decontrol or other changes in the government attitude. Domestic consumption of *Hevea* latex during August was estimated at 3,300 long tons, dry weight; imports, 4,400 long tons; and privately held month-end stocks, 5,700 long tons.

The GR-S latex market picture showed no changes during the period from September 16 to October 15. The GSA selling price continued at 26¢ a pound dry weight, for low solids latex, and 27.75¢ for concentrated types. July production of GR-S latex was estimated at 2,220 long tons, dry weight; imports, 188 long tons; consumption, 2,062 long tons; and month-end stocks, 2,955 long tons.

SCRAP RUBBER

THE scrap rubber market continued in a depressed condition during the period September 16-October 15. Prices were easier for all grades except peelings, and only limited movement of scrap to reclaiming mills was reported. Because of the low prices and the higher freight rates, the flow of scrap supplies from outlying areas has sharply declined. These dealers, instead of handling scrap rubber, have been concentrating on other waste materials that permit them to operate on a greater margin of profit.

The outlook for scrap rubber is not encouraging, since reclaimers are said to be adequately supplied with stocks and buying only to meet spot needs. Export business is also in the doldrums. Japan and other foreign countries that normally buy large quantities in the domestic markets have either severely curtailed or completely stopped purchasing owing to their lack of dollar exchange.

Following are dealers' selling prices for scrap rubber, in carload lots, delivered to mills at the points indicated:

	Eastern Points	Akron, O.
	(Per Net Ton)	
Mixed auto tires	$18.00	$19.00
Peelings, No. 1	52.00	54.50
3	27.50	30.00
	(¢ per Lb.)	
Black inner tubes	7.5 / 7.75	
Red passenger tubes	10.75 / 11	

RECLAIMED RUBBER

THE reclaimed rubber market showed some improvement during the latter half of September, and sales for the month were only about 11% below the August level. Sales of reclaim during the first half of October indicate a monthly volume of about 8% above the September figure. Production of reclaim continues at a high rate, although some plants are now operating on a six-day week.

Final July and preliminary August statistics on the domestic reclaimed rubber industry are now available. Final July figures give a production of 29,999 long tons; consumption, 25,500 long tons; exports, 1,017 long tons; and month-end stocks, 44,347 long tons. Preliminary figures for August show a production of 28,814 long tons; consumption, 28,985 long tons; exports, 1,040 long tons; and month-end stocks, 44,414 long tons.

There were no changes in reclaimed rubber prices during the period from September 16 to October 15. In general, prices were at the ceiling levels set forth in CPR 58 (see September issue, page 756), except for peel reclaim, which was selling at 10¢ a pound, or 0.5¢ below the ceiling price for this grade.

COTTON AND FABRICS

NEW YORK COTTON EXCHAGE
WEEK-END CLOSING PRICES

Futures	July 28	Aug. 25	Sept. 22	Sept. 29	Oct. 6	Oct. 13
Dec.	34.92	34.85	36.05	36.50	36.52	36.64
Mar.	34.92	34.92	36.10	36.47	36.47	36.48
May	34.89	34.89	36.04	36.48	36.44	36.38
July	34.57	34.49	35.65	35.93	35.96	35.98
Oct.	32.85	33.28	34.35	34.82	34.72	34.81
Dec.	32.73	33.16	34.29	34.80	34.69	34.79

COTTON prices advanced on the New York Cotton Exchange during the period from September 16 to October 15. Most of the price rise occurred during the third week in September on the basis of reports that cotton growers are holding back 45-70% of their crop to bolster market prices. Farmers were said to be holding out for a minimum price of 40¢ a pound to avoid losses, as a result of a market price drop of about 9¢ a pound since planting time. A rapidly mounting CCC cotton loan total reflected the determination of growers to wait for an improved market. Aiding in the advance was congressional approval of a $1,000,000,000 increase in lending authority of the Export-Import Bank, which was expected to expedite short-term loans for foreign buying of cotton.

Toward the end of September the price advance was halted as the expected reaction set in and mixed reports were received as to the size of the current crop. On October 15 the United States Department of Agriculture announced that there will be no cotton marketing quotas for next year in view of the possibility of a cotton shortage. The total supply of short staple cotton for the 1951-1952 marketing season is 18,953,000 running bales, which includes a carry-over of 2,106,000 bales, estimated production of 16,737,000 bales, and estimated imports of 110,000 bales. The calculated normal supply is 20,852,000 bales, which indicates a shortage of 10%. Total supply of long-staple cotton is estimated at 207,000 bales, as compared to the normal supply of 208,000 bales.

The middling spot price for 15/16-inch cotton started the period under review at 35.95¢ a pound, dropped back to a low of 35.75¢ on September 17, rose to a high of 38.35¢ on September 26, then fluctuated irregularly to close at 37.85¢ on October 15. Cotton futures prices showed corresponding movements, and December futures ended the period at 36.87¢.

Fabrics

Demand continued to lag far behind the normal buying season for most types of industrial cotton fabrics during the period from September 16 to October 15. Trading was unusually slow on practically all heavy goods except numbered army ducks and some rubberizing fabrics. Buying for fourth-quarter delivery was said to be more than six weeks overdue in comparison with a normal buying year, since

CLASSIFIED ADVERTISEMENTS

Continued

MACHINERY AND SUPPLIES FOR SALE

FOR SALE: 1—8' X 35' HIGH PRESSURE VULCANIZER: 1—16" x 42" Mill with drive & 75 h.p. motor: 1—Royal #4 Tuber, stainless steel screw and liner; 1—Elmes 37 x 37, 10-opening Hydraulic Press, 30" ram. Send us your inquiries. CONSOLIDATED PRODUCTS CO., INC., 13-16 Park Row, New York 38, N. Y.

FOR SALE: NEW EQUIPMENT NEVER USED—STILL CRATED. 1—Erie 393-Ton Molding Press, 3—Platen, cures 2 molds at one time. 1—15 h.p. Hydraulic Pump and Greer Accumulator. ARTWIRE CREATIONS, INC., Suffern, N. Y.

FOR SALE: 1—15 H.P. MODEL A-15 AMES HORIZONTAL steam boiler with full controls, less condensate pumping unit. Purchased new, used 18 months; purchasing new one for increased capacity. Can be inspected in operation. Ready for sale approximately Nov. 30. NICHOLS ENGINEERING, 479 Ferry Blvd., Stratford, Conn.

FOR SALE: 1—40-INCH RUBBER MILL WITH DRIVE, COMplete with 50 horsepower motor and controls. INDUSTRIAL ADHESIVES, INC., 4208 Airport Road, Cincinnati, Ohio.

FOR SALE: BANBURY MIXERS, MILLS, CALENDERS, LABOratory Mill and Banbury Unit, Extruders, Tubers, Hydraulic Presses. Send for detailed bulletin. EAGLE INDUSTRIES, INC., 110 Washington Street, New York 6, N. Y. DIGBY 4-8364-5-6.

FOR SALE: 8 PELLET PRESSES, KUX MODEL 25 (21 PUNCH and 25 punch); Stokes D-3 and D-4. Read Co., 250-gal. heavy-duty double-arm sigma blade jacketed mixers. PERRY EQUIPMENT CORP., 1424 N. 6th St., Phila., 22, Pa.

CANVAS AND RUBBER FOOTWEAR AND NATURAL-COLOR stationery rubber bands for sale any quantity, any size, or made to specification. FUNG KEONG RUBBER MANUFACTORY, LIMITED, P. O. Box 100, Kuala Lumpur, Malaya.

FOR QUICK SALE. BULL GEAR, PINION, AND PINION SHAFT for #27 Banbury. Gear ratio 126 to 18. 30-inch face. No evidence of wear. INTERSTATE WELDING SERVICE, Offices, Metropolitan Building, Akron 8, Ohio.

FOR SALE

No. 11 Banbury Mixer, with drive and 2-speed motor.
One 26" x 84" Adamson Batch-Out Mill, drive and motor.

LANDIN RUBBER CORPORATION

146 West 27th Street • Chicago, Illinois

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TUBERS, VULCANIZERS, MIXERS, ETC.
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TECHNICAL DATA ON REQUEST
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Mills — Hyd. Presses — Calenders — Banbury Mixers — Pumps — Extruders — Bale Cutters — Slitters — Vulcanizers — Grinders — Choppers — etc.

As well as all miscellaneous equipment necessary to the processing of rubber, contact the:
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VULCANIZERS, ACCUMULATORS
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UNITED RUBBER MACHINERY EXCHANGE
183-189 ORATON ST. CABLE "URME" NEWARK 4, N. J.

(Classified Advertisements Continued on Page 255)

trading for the last quarter usually begins in August. This year, forward business has been very limited, particularly on sateens, broken twills, wide drills and sheetings, and flat ducks.

Minor sales of headlinings were made to the automotive trade, and sales of hose and belting ducks and chafer fabrics were reported only moderate. Tire manufacturers were said to be extremely cautious in their purchases of chafers and cotton tire cords in view of uncertainty as to future tire demand. This uncertainty extends not only to actual tire volume, but also to the types of tires which will be needed by the military services. Military buying of tires to date is held negligible and far below expectations. In a normal civilian market the 11.65-ounce chafer fabric, used for auto tires, accounts for about two-thirds of over-all chafer demand, with the 14-ounce fabric, used for trucks, buses, and military vehicles, accounting for the bulk of other tire requirements. Large military orders for tires, therefore, can greatly upset this ratio of chafer requirements.

Cotton Fabrics

Drills			
59-inch 1.85-yd.	yd.	$0.375	/ $0.40
2.25-yd		.32	/ .3375
Ducks			
38-inch 1.78-yd. S. F.	yd.	.615	
2.00-yd. D. F.	yd.	.38	
51.5-inch, 1.35-yd, S. F.		.5475	
Hose and belting		.72	
Osnaburgs			
40-inch 2.11-yd.	yd.	.27	
3.65-yd.	yd.	.165	/ .17
Raincoat Fabrics			
Print cloth, 38½-inch, 64x60		.1525	
Sheeting, 48-inch, 4.17-yd		.2225	
52-inch 3.85-yd		.24	
Chafer Fabrics			
14-oz./sq. yd. Pl.	lb.	.76	/ .78
11.65-oz./sq. yd. S.		.70	
10.80-oz./sq. yd. S.		.73	/ .74
8.9-oz./sq. yd. S.		.75	/ .755
Other Fabrics			
Headlining, 68-inch 1.35-yd., 2-ply	yd.	nom.	
64-inch, 1.25-yd. 2-ply		.66	
Sateens, 53-inch 1.32-yd		.65	
58-inch 1.21-yd.		.7175	
Tire Cords			
K. P. std., 12-3-3	lb.	nom.	
12-4-2		.82	

RAYON

RAYON shipments by United States producers to domestic consumers in September amounted to 82,100,000 pounds, a drop of 16% from the August figure and 25% below the average monthly total for the second quarter of this year. September shipments of viscose high-tenacity yarn totaled 27,900,000 pounds, a decline of 1,600,000 pounds from the previous month's figure. Producer-held stocks of high-tenacity yarn on September 30 were 1,800,000 pounds, unchanged from the August total.

There were no changes in rayon tire yarn and fabrics prices during the period from September 16 to October 15, and current prices follow:

Rayon Prices

Tire Fabrics		
1100/490/2		$0.72
1650/980/2	$0.695	/ .73
2200/980/2		.685
Tire Yarns		
1100/480	$0.62	/ 0.63
1100/490		.62
1150/490		.62
1650/720	.61	/ .62
1650/980		.61
1900/980		.61
2200/960		.61
2200/980		.60
4400/2934		.63

Compounding Ingredients Price Listing

THE two columns of prices for various compounding ingredients, published quarterly in India RUBBER WORLD, have always been based on the lowest and the highest price for a given material, i. e., the range depending on quantity involved, usually for cl. and lcl. lots.

These listings are occasionally subject to criticism for two major reasons: (1) The prices in some instances are not up-to-date. (2) The prices shown sometimes indicate differences between different suppliers of the same item, where such differences do not actually exist.

India RUBBER WORLD can only show up-to-date prices if up-to-date and complete information is furnished by the suppliers. Although the complete price list is published only once every three months, important changes in the prices of ingredients which occur in the intervening months are published each month *when provided*. We urge compounding ingredients suppliers to check the prices listed for their products each time they appear and to notify us promptly when changes are needed.

Differences in the price for a given item may occur because, when submitting their quotations, some suppliers neglect to indicate the quantity or method of shipment on which a price is based, and because our method of listing is limited to two columns when as many as five columns might be necessary to provide complete details of prices when that many means of shipment are available. Carbon black, for example, may be quoted for shipment by the carload in bulk or in bags and in bags for less-than-carload lots. Since the lowest price is for carloads in bulk, this price is shown in our list, and the supplier quoting only carloads in bags would appear to sell for a higher price.

India RUBBER WORLD wishes to make its compounding ingredients price listing as accurate and as up-to-date as possible. Suggestions and cooperation will be welcome.—EDITOR.

Compounding Ingredients — Price Changes and Additions

Accelerators, Organic			
Altax	lb.	$0.42	$0.44
Rodform	lb.	.425	.445
Amax	lb.	1.00	
Butyl Eight	lb.	1.10	/ 1.35
Captax	lb.	.34	.36
Rotax	lb.	.44	.46
Zetax	lb.	.43	/ .45
Accelerator-Activators, Inorganic			
Lime, hydrated	ton	14.00	15.50
Litharge commil.	lb.	.21	.22
Eagle, sublimed	lb.	.2165	.2175
National Lead	lb.	.2165	.2175
Red lead, commil.	lb.	.2175	.2382
Eagle	lb.	.2257	
National Lead	lb.	.2255	
White lead, basic	lb.	.201	.211
Eagle, National lead	lb.	.201	.211
Silicate	lb.	.1715	.2371
Eagle	lb.	.2204	.2371
National Lead	lb.	.1715	.1815
Accelerator-Activators, Organic			
Emersol 110	lb.	.1325	.145
120	lb.	.1375	.15
130	lb.	.16	.1725
210 Elaine	lb.	.1375	.165
Emery 600	lb.	.11	.1375
Antioxidants			
AgeRite Alba	lb.	2.20	/ 2.30
Tysonite	lb.	.24	/ .2475
Carbon Blacks			
(GPF) Sterling V	lb.	.05	.09
(FT) P-33	lb.	.055	
(MT) Thermax	lb.	.035	
Stainless	lb.	.045	
Chemical Stabilizers			
Vanstay L	lb.	.33	.35
Dispersing Agents			
Darvan Nos. 1, 2	lb.	.22	.30
Dusting Agents			
Pyrax A	ton	13.50	
W. A.	ton	16.00	
Extenders			
Hard Hydrocarbon	ton	46.50	/ 48.50
Finishes			
Nytal 200	ton	25.00	
300	ton	36.00	
Van Wax	gal.	1.45	/ 1.50
Latex Compounding Ingredients			
Setsit-5	lb.	.75	/ 1.05
Sulfur dispersion (73%)	lb.	.12	/ .14
Zinc oxide dispersion (50%)	lb.	.40	
Mold Lubricants			
Vanfre	gal.	2.50	3.00
Plasticizers and Softeners			
Reogen	lb.	.1325	.135
Vulcanizing Agents			
Telloy	lb.	2.50	
Vandex	lb.	3.50	

United States Rubber Statistics — July, 1951

(All Figures in Long Tons, Dry Weight)

	New Supply			Distribution		Month-End Stocks
	Production	Imports	Total	Consumption	Exports	
Natural rubber, total	0	67,561	67,561	32,665	0	63,164
Latex, total	0	5,619	5,619	2,813	0	4,652
Rubber and latex, total	0	73,180	73,180	35,478	9	67,816
Synthetic rubbers, total	*69,862 †6,388	515	76,765	61,419	966	89,527
GR-S types‡	*64,454 †24	448	64,926	51,174	110	71,329
Butyl	*5,408	67	5,475	5,582	0	7,547
Neoprene‡	†4,953	0	4,953	3,673	682	6,879
Nitrile types‡	†1,411	0	1,411	960	174	3,772
Natural rubber and latex, and synthetic rubbers, total	76,250	73,695	149,945	96,897	966	157,343
Reclaimed rubber, total	29,999	0	29,999	25,500	1,017	44,347
GRAND TOTALS	106,249	73,695	179,944	122,397	1,983	201,690

*Government plant production.
†Private plant production.
‡Includes latices.
SOURCE: Rubber Division, NPA, United States Department of Commerce, Washington, D. C.

CLASSIFIED ADVERTISEMENTS

Continued

MACHINERY AND SUPPLIES FOR SALE (Continued)

FOR SALE: FARREL 18" x 45", 16" x 48", AND 15" x 36", 2-ROLL Rubber Mills, also new Lab. 6" x 12" Mixing Mills and Calenders, & other sizes up to 84". Rubber Calenders. Extruders 2" to 3". Rotary Cutters. Sargent 3-apron conveyer, 6-fan Rubber Dryer, Baker-Perkins Mixers 200 & 9 gal., heavy-duty double-arm. Impregnating Units Lab. size and up. Large stock Hydraulic Presses from 12" x 12" to 42" x 48" platens, from 50 to 1,500 tons. Hydraulic Pumps and Accumulators. Grinders. Crushers, Churns, Rubber Bale Cutter with 15 h.p. motor, etc. SEND FOR SPECIAL BULLETIN. WE BUY YOUR SURPLUS MACHINERY. STEIN EQUIPMENT COMPANY, 90 WEST STREET, NEW YORK 6, N. Y.

MACHINERY AND SUPPLIES WANTED

WANTED—TO EXPEDITE PRODUCTION—RUBBER MAKING machinery including Banbury Mixers, Heavy-Duty Mixers, Calenders, Rubber Rolls & Mixers, Extruders, Grinders & Cutters, Hydraulic Equipment, Rotary and Vacuum Shelf Dryers, Injection Molding Machines. Will consider a set up plant now operating or shut down. When offering give full particulars. P. O. Box 1351, Church Street Sta., New York 8, N. Y.

WE ARE INTERESTED IN PURCHASING ALL TYPES OF RUBber machinery consisting of mills, Banbury mixers, extruders, calenders, vulcanizers, etc., and also complete plants. Address Box No. 911, care of INDIA RUBBER WORLD.

WANTED: RUBBER MILL COMPLETE WITH DRIVE AND starter in good operating condition. Size 40" to 54". Address Box No. 912, care of INDIA RUBBER WORLD.

WANTED: 2,000-GAL. JACKETED STEEL TANK SUITABLE FOR rubber latex compounding. Also horizontal 12,000-gal. steel storage tank. Address Box No. 913, care of INDIA RUBBER WORLD.

WANTED: RUBBER GRINDING EQUIPMENT. #2 OR #3 Tuber, 36" or 42" mill. Give price, location, and condition. Private firm. Address Box No. 914, care of INDIA RUBBER WORLD.

SMALL VULCANIZER 12" TO 18" DIAMETER BY APPROXImately 2 feet long. Tested for 40 lbs. operating pressure. ASSOCIATED RUBBER, INC., Quakertown, Pa.

EXPERT MIXING AND CALENDERING

Rubber and GRS mixing and plastic compounding and calendering. All work done under careful supervision. Also precision grinding and pulverizing.

QUICK SERVICE

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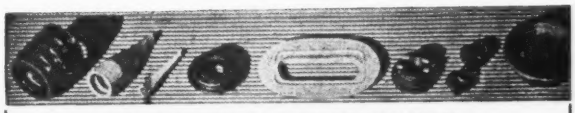

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U. S. Imports, Exports, and Reexports of Crude and Manufactured Rubber

Exports of Domestic Merchandise

	June, 1951 Quantity	June, 1951 Value
UNMANUFACTURED, Lbs.		
Chicle and chewing gum bases	305,040	$153,040
Balata	24,245	16,833
Synthetic rubbers		
GR-S types	105,607	32,285
Neoprene	829,840	341,954
Nitrile types	254,645	133,401
"Thiokol"	1,300	698
Polyisobutylene	87,511	38,255
Others, except butyl	4,267	2,031
Reclaimed rubber	3,222,962	322,196
Scrap rubber	3,710,545	224,330
TOTALS	8,545,962	$1,265,023
MANUFACTURED		
Rubber cement, *gals.*	90,508	$187,254
Rubberized fabric		
Auto cloth, *sq. yds.*	3,759	7,339
Piece goods and hospital sheeting, *sq. yds.*	104,057	98,539
Rubber footwear		
Boots, *prs.*	11,307	51,548
Shoes, *prs.*	8,057	22,213
Rubber-soled canvas shoes, *prs.*	18,519	36,924
Soles, *doz. prs.*	14,410	57,995
Heels, *doz. prs.*	59,364	70,999
Soling and toplift sheets, *lbs.*	438,071	86,966
Gloves and mittens, *doz. prs.*	29,848	117,837
Drug sundries		
Water bottles and fountain syringes, *no.*	36,366	29,864
Other	.....	275,877
And rubberized clothing	.....	135,316
Toy and novelty balloons	.....	26,133
Toys and balls	.....	31,806
Erasers, except pencil, *lbs.*	35,621	25,899
Hard rubber goods:		
Battery boxes, *no.*	35,022	73,376
Other electrical, *lbs.*	167,977	115,229
Combs, finished, *doz.*	6,130	7,467
Other	.....	18,542
Tires and casings:		
Truck and bus, *no.*	65,144	3,436,261
Auto, *no.*	53,045	847,013
Aircraft	.....	156,924
Farm tractor, etc., *no.*	6,140	282,036
Other off-the-road, *no.*	6,542	864,460
Bicycle, *no.*	34,889	48,989
Motorcycle, *no.*	433	4,464
Other, *no.*	1,464	28,581
Inner tubes: auto, *no.*	30,777	57,863
Truck and bus, *no.*	32,489	132,053
Aircraft, *no.*	792	8,243
Other, *no.*	30,464	46,537
Solid tires: truck and industrial, *no.*	1,971	58,864
Other, *lbs.*	15,712	5,434
Tire repair materials		
Camelback, *lbs.*	339,101	134,940
Other, *lbs.*	285,850	272,973
Rubber and friction tape, *lbs.*	65,033	55,570
Belting: auto and home, *lbs.*	132,901	172,144
Transmission		
V-belts, *lbs.*	124,566	273,278
Flat belts, *lbs.*	29,261	102,805
Other, *lbs.*	48,340	61,499
Conveyer and levitator, *lbs.*	166,012	154,754
Other, *lbs.*	870	2,138
Hose and tubing, *lbs.*	519,937	465,897
Packing, *lbs.*	182,959	240,494
Mats, flooring, tiling, *lbs.*	736,100	197,769
Thread: bare, *lbs.*	19,079	41,765
Textile covered, *lbs.*	24,689	85,499
Gutta percha manufactures, *lbs.*	8,436	3,324
Compounded latex and rubber for further manufacture, *lbs.*	426,000	210,511
Other natural and synthetic rubber manufactures	.....	651,511
TOTALS	.....	$10,581,716
GRAND TOTALS, ALL RUBBER EXPORTS	.....	$11,846,739

Reexports of Foreign Merchandise

	June, 1951 Quantity	June, 1951 Value
UNMANUFACTURED, Lbs.		
Crude rubber	501,200	$423,689
Balata	21,044	16,835
Jelutong and gutta percha	1,268	685
Buna S synthetic rubber	4,613	672
Scrap rubber	119,588	21,990
TOTALS	647,713	$463,871
MANUFACTURED		
Drug sundries: water bottles and fountain syringes, *no.*	2,400	$500
Other	.....	229
Toy and novelty balloons	.....	988
Rubber toys and balls	.....	1,861
TOTALS	.....	$3,578
GRAND TOTALS, ALL RUBBER REEXPORTS	.....	$467,449

Imports for Consumption of Crude and Manufactured Rubber

	June, 1951 Quantity	June, 1951 Value
UNMANUFACTURED, Lbs.		
Crude rubber	116,058,149	$61,809,219
Latex	10,509,857	7,475,970
Crude chicle	323,050	203,716
Guayule	268,000	84,110
Balata	507,594	153,222
Jelutong or Pontianak	338,193	250,828
Gutta percha	160,714	63,998
Synthetic rubber	995,722	242,400
Reclaimed rubber	44,092	2,700
Scrap rubber	3,424,018	253,309
TOTALS	132,629,389	$70,539,472
MANUFACTURED		
Tires and casings		
Auto, etc., *no.*	4,050	$203,236
Bicycle, *no.*	2,538	4,741
Other, *no.*	175	19,793
Inner tubes: auto, etc., *no.*	330	889
Rubber footwear		
Boots, *prs.*	1,206	3,783
Shoes and overshoes, *prs.*	12,778	7,916
Rubber-soled canvas shoes, *prs.*	12,684	13,828
Athletic balls: golf, *no.*	98,640	27,031
Tennis, *no.*	38,842	10,645
Other, *no.*	54,831	9,372
Rubber toys, except balloons	.....	29,104
Hard rubber goods		
Combs, *no.*	72,479	7,3646
Sundries	.....	
Other	.....	64,101
Rubberized printing blankets, *lbs.*	564	1,618
Rubber and cotton packing, *lbs.*	2,188	3,397
Gaskets and valve packing	.....	1,693
Belting, *lbs.*	11,887	14,502
Hose and tubing	.....	35,144
Drug sundries	.....	14,907
Nipples and pacifiers, *gross*	1,868	5,414
Instruments, *doz.*	1,377	7,133
Other rubber products	.....	32
Rubber golf ball centers	.....	830
Gutta percha manufactures, *lbs.*	5,063	1,572
Rubber bands, *lbs.*	14,158	14,228
Synthetic rubber products	.....	642
Other soft rubber goods	.....	139,739
TOTALS	.....	$642,660
GRAND TOTALS, ALL RUBBER IMPORTS	.....	$71,182,132

SOURCE: Bureau of Census, United States Department of Commerce, Washington, D. C.

Trade Lists Available

The Commercial Intelligence Branch, United States Department of Commerce, Washington, D.C., recently compiled the following trade lists, of which mimeographed copies may be obtained by American firms from this Branch and from Department of Commerce field offices at $1 a list for each country.

Aircraft & Aeronautical Supply & Equipment Importers and Dealers—Angola; France; Indonesia.

Automotive Equipment Importers & Dealers—France; Germany; Iran.

Electrical Supply & Equipment Importers & Dealers—India.

Plastic Material Manufacturers, Molders, Laminators & Fabricators of Plastic Products—Belgium; Germany; Japan; Sweden; United Kingdom.

Estimated Automotive Pneumatic Casings and Tube Shipments, Production, Inventory, August, July, 1951; First Eight Months, 1951-1950

	August, 1951	% of Change from Preceding Month	July, 1951	First Eight Months, 1951	First Eight Months, 1950
Passenger Casings					
Shipments					
Original equipment	2,356,325		1,915,140	19,099,762	24,223,081
Replacement	3,224,906		3,248,214	23,679,866	33,053,680
Export	53,244		53,529	432,714	378,139
TOTAL	5,634,475	+ 8.0	5,216,883	43,212,342	57,654,900
Production	6,020,860	+14.06	5,278,478	43,097,333	52,686,349
Inventory end of month	2,967,432	+16.89	2,538,650	2,967,432	3,825,902
Truck and Bus Casings					
Shipments					
Original equipment	454,804		446,322	3,780,278	3,070,927
Replacement	1,005,210		877,743	6,799,780	6,394,111
Export	67,181		61,188	511,823	511,356
TOTAL	1,527,195	+10.25	1,385,253	11,091,881	9,976,394
Production	1,527,718	+ 4.99	1,455,071	11,407,643	9,227,292
Inventory end of month	1,065,074	+ 1.71	1,047,128	1,065,074	968,425
Total Automotive Casings					
Shipments					
Original equipment	2,811,129		2,361,462	22,880,040	27,294,008
Replacement	4,230,116		4,125,957	30,479,646	39,447,791
Export	120,425		114,717	944,537	889,495
TOTAL	7,161,670	+ 8.48	6,602,136	54,304,223	67,631,294
Production	7,548,578	+12.10	6,733,549	54,504,976	61,913,641
Inventory end of month	4,032,506	+12.46	3,585,778	4,032,506	4,794,327
Passenger (Including Motorcycle) and Truck and Bus Tubes					
Shipments					
Original equipment	2,809,437		2,361,850	22,901,965	27,292,705
Replacement	2,864,853		2,637,040	23,192,519	29,512,294
Export	86,608		73,107	557,161	476,239
TOTAL	5,760,898	+13.58	5,071,997	46,651,645	57,281,238
Production	6,138,854	+18.56	5,177,859	44,851,600	52,536,200
Inventory end of month	6,272,190	+10.34	5,684,678	6,272,190	6,619,472

NOTE: Cumulative data on this report include adjustments made in prior months.
SOURCE: The Rubber Manufacturers Association, Inc., New York, N. Y.

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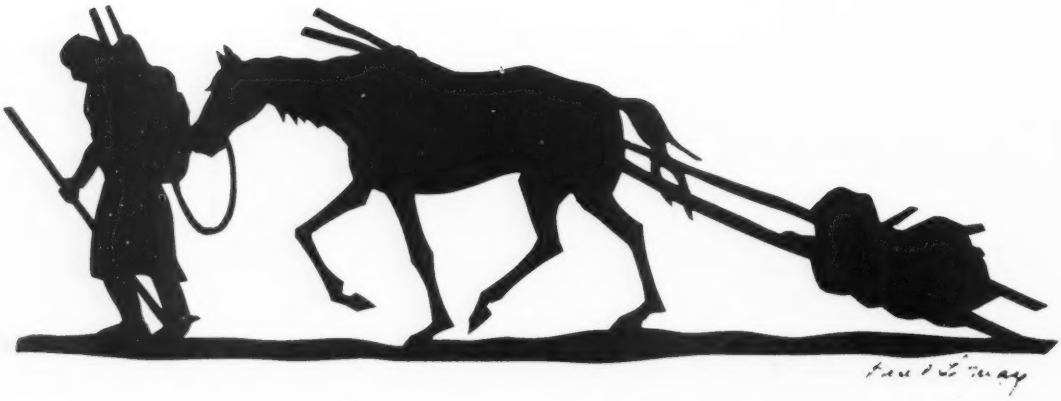

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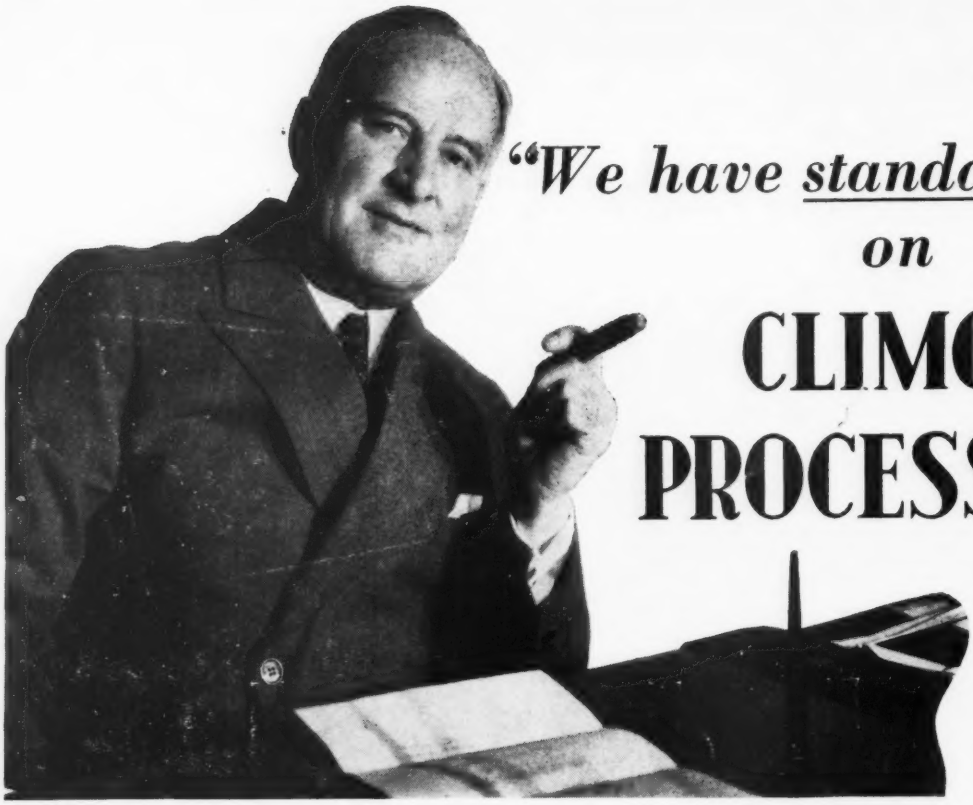

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